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THE GENERIC AND SPECIFIC CHARACTERS OF FOUR OLD AND SIX NEW ASILINI GENERA IN THE WESTERN UNITED STATES, MEXICO, AND CENTRAL AMERICA

(Diptera: Asilidae)[1]

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INTRODUCTION

Revision of four old genera and erection of six new genera in the Asilini (Asilidae) with 35 named and 47 new species and subspecies from the western United States, Mexico, and Central America, show that some genera in the Asilini can be identified by means of one or more organs of the male genitalia, while in other genera the male genitalia offer reliable specific characters only. Also, the drawings of Tsacas (1968,1969), and of Artigas (1970), are useful for studying the male genitalia as generic characters.

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The 10 revisions include *Machimus* Loew with 30 Nearctic species and subspecies, *Negasilus* Curran with five Nearctic species, *Neomochtherus* Osten Sacken with seven Nearctic species, *Pachychoeta* Bigot with eight Neotropical species, and six North and Central American new genera with 32 old and new species.

The above 35 named Nearctic species were assigned to the Palearctic genus *Asilus* Linnaeus, a depository for often unrelated species from over the world. In the present paper, these 35 Nearctic species are assigned to genera other than *Asilus*. Several species other than the 35 are mentioned. *Asilus* is redescribed here, and believed to be confined to the Palearctic realm.

Keys to the genera and to their new and described species are given.

The 7 described and 23 new species and subspecies in the North American *Machimus* form three major groups associated with three geographical centers of distribution. These groups are keyed.

ORGANS OF MALE GENITALIA

Karl's (1959) terms for the organs of the male genitalia of the Asilidae are used. These are briefly discussed to assist the reader in following the discussions and descriptions.

Proctiger. As Cole (1927) and Karl (1959) noted, the proctiger of the Asilidae consists of dorsal and ventral sclerites surrounding the anal opening. The proctiger moves through an arc of about 90°; in *Machimus* the ventral sclerite also moves laterad. Authors suggest that the dorsal sclerite represents cerci. At the hinge of the proctiger are processes of various shapes and positions in many species, but these are absent in others. *Prolatiforceps dolichomera* (Williston) has a process both at the hinge and beyond at the margin of the base.

Apically the proctiger of some species is important taxonomically. In *Machimus callidus* (Williston)(Tolmerus Group), and *M. adustus* Martin (Tenebrosus Group), there is a triangular or pyramidal projection ventrally near the apex (figs. 1, 2, 6). The proctiger of *M. sadyates* (Walker) is bizzare (fig. 3), the apex being compressed into a thin lamella. The proctiger of *M. submaculus* Martin and of *M. humilis* (Bellardi) is V-shaped.

Epandria. Other names for the epandria (subdivided tergite 9) include claspers, superior forceps, parameres, and surstyli. The epandrial bristles are used as generic characters for *Polacantha* Martin.

Hypandrium. In the Asilini the ventral, often three-cornered hypandrium (sternite 9) is not reduced, nor is it coalesced with the basistyli.

Basistyli. In the Asilini the basistyli are a second pair of forceps extending posteriad between the dorsal

epandria and the single ventral hypandrium. Usually the basistyli are similar from species to species.

Dististyli. The dististyli, which are important in the identification of species, are upright appendages attached to the base of the inside of the basistyli in the Asilini. Many writers refer to the dististylus + the basistylus as a gonopod to emphasize the dististylus' being an appendage of the basistylus.

Aedeagal sheath. While technically the aedeagus is a membranous sac within the aedeagal sheath, the term aedeagus is also used for the aedeagal sheath itself. The aedeagal sheath extending between and beyond the upright dististyli is tuboid basally; apically it is either single-tubed, bifid, or trifid.

The genital tubes that are attached laterally in other genera, are attached ventrally in *Polacantha* Martin (fig. 43). The length of the two ventral tubes ranges from very short to as long as the median tube. The ventral attachment of the tubes is unique to *Polacantha*.

In most genera if one species of the genus is either unitubed, bifid, or trifid, then the other species in the same genus have the same number of tubes. However, *Prolatiforceps* Martin is an exception, having one to three, short to long apical tubes.

Bifid tubes. The following Western Hemisphere Asilini have bifid aedeagal sheaths: *Cerozodus* Bigot; *Dicropaltum* Martin; *Eccritosia* Schiner; *Furcilla* Martin; *Lecania* Macquart; *Myaptex* Hull; *Proctacanthus* Macquart; and *Proctacanthella* Bromley.

IDENTIFICATION USING MALE GENITALIA. These are suggestions for identifying with the male genitalia of *Machimus* or of other genera when not cleared with NaOH. The hinge of the proctiger can be observed for processes by sniping off an epandrium with needle-nosed tweezers or by relaxing and spreading the genitalia. If necessary, break off the basistylus, piece by piece, to expose the dististylus which is attached to the base of the basistylus in members of the Asilini. Unless the aedeagal sheath is extended, it cannot be observed without removing the dististylus. The parts may be cemented to a point.

A small amount of xylene or some similar fluid applied with a small brush, will expose the background color of the specimens.

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Systematic Descriptions

Key to western North and Central American Genera often Assigned to the Palearctic Genus *Asilus*

1. Tergite 2 with a patch of dense, erect or recumbent, short to long coarse bristles present laterally; tergite 3 with a patch of shorter bristles; no bristles laterad on incisures; mystax bristles mostly coarse; proboscis tapering; wings opaque yellowish; length 15-25 mm. (Palearctic, not Nearctic) .... *Asilus* Linnaeus

   Tergites 2 and 3 either without lateral bristle patch, or when patch present, bristles long, weak to hairlike 2

2(1). Apical tarsal segment of foreleg with two strong bristles projecting over basal third or less of tarsal claws; wings opaque, subhyaline along posterior veins; tergite 8 of female pollinose (Arizona to Panama) ..... *Wyliea* Martin, new genus

   Apical tarsal segment of foreleg without strong bristles projecting over tarsal claws; wings hyaline to opaque; tergite 8 of female either polished or pollinose 3

3(2). Metanotal callus with bristles or pile 8

   Metanotal callus bare of bristles or pile; posterior cell 4 and anal cell petiolate 4

4(3). Longitudinal moderately strong gibba on lower 5/8 of narrow face, with a fan of dense, long, slender bristles; mesonotum medially broadly bristled the whole length; tergites 2-6 without bristles laterally on incisures (Ecuador) (*?Regasilus blantoni* Bromley, Nevada) ..... *Regasilus* Curran

Gibba weak, conical or longitudinal; tergites with bristles laterally on incisures 5

5(4). Disc of scutellum rounded with scattered short bristles; sternite 9 of female with a ventral spined keel; hypandrium extends beyond apex of basistyli (Mexico to Brazil) ..... *Pachychoeta* Bigot

Strong, long bristles on posterior margin of rounded disc of scutellum; sternite 9 of female without keel; hypandrium not extending beyond apex of basistyli 6

6(5). Bristles laterally on incisures recumbent, about as strong and as long as or slightly longer than other vestiture; scutellum with bristles of equal length on disc and posterior margin; ovipositor more or less tubular, both small and large spines on tergite 9 (United States; Mexico) .... *Proctacanthella* Bromley

Bristles laterally on incisures erect, stronger, and longer than other vestiture; ovipositor flat, without spines 7

7(6). Epandria long and narrow; aedeagal sheath bifurcate; 3-4 strong short bristles laterally on incisures; tergites 8-10 of female shorter than 6-7 (Sonora) .. .. *Furcilla* Martin, new genus

Epandria broad, truncate, or medially a triangle on truncation; apically aedeagal sheath with 3 long slender tubes; incisures with 1-3 strong short bristles laterally; tergites 8-10 of female as long as or longer than tergites 6-7 (Mexico; Guatemala; Honduras; Nicaragua) .... *Wilcoxius* Martin, new genus

8(3). Inside surface of epandrium without a patch of erect spines on apical half 10

Inside surface of epandrium with a patch of several to many erect spines on the apical half or less (*Polacantha* Martin, new genus)..... 9

9(8). Processes projecting from inside surface of epandrium, spines on inside surface of epandrium and on the processes (Mexico; California) .....
Polacantha (Echinitropis) Martin, new subgenus
No processes projecting from inner surface of epandrium, only erect spines (southern United States; Mexico) .....
.. *Polacantha (Polacantha)* Martin, new subgenus

10(8). Upper face polished; median aedeagal tube 3 times longer than lateral tubes, apex bent (Canada; United States); 1 species, *N. nitifacies* Hine ..... *Nigrasilus* Hine
Upper face tomentose 11

11(10). Aedeagal sheath bifurcate; gibba weak; length 7-10 mm. (Kansas; New Mexico; Texas)..... *Dicropaltum* Martin, new genus
Aedeagal sheath single or triple-tubed; gibba weak to strong; length 7-25 mm. 12

12(11). Occipital bristles apically strongly to weakly bent anteriad; thick, fine hairs on gibba (Worldwide) .....
..... *Neoitamus* Osten Sacken
Occipital bristles straight or broadly curved, not bent apically; bristles on gibba 13

13(12). Tergite 10 of female inserted into dorsal surface of tergite 9; males similar to *Machimus* (Holarctic); 1 species in United States, *E. lecythus* (Walker)..... *Eutolmerus* Loew
Tergite 10 of female posteriad to tergite 9 14

14(13). Apex of epandrium without a notch, or at most with an emargination; aedeagal sheath 3-tubed 16
Epandrium notched apically on rounded apex; aedeagal sheath a large single tube with 1-3 microtubes apically 15

15(14). Dorsocentrals posteriad to transverse suture; epandria apicodorsally wider than abdomen; posterior margins of sternites with strong bristles (Holarctic; Ethiopian)..... ..... *Neomochtherus* Osten Sacken

Dorsocentrals anteriad to transverse suture; most specimens without strong bristles on posterior margins of sternites (Holarctic) .... *Cerdistus* Loew

16(14). Tergites 2-3 laterad with only short recumbent bristles; style about 1/4 as long as antennal segment 3 (Canada; United States)..... *Negasilus* Curran

Tergites 2-3 laterad with a few to a patch of hairs longer than the short recumbent bristles; ovipositor flattened laterally 17

17(16). Bristles laterally on incisures long, weak; pile on sternites long, usually abundant; long, erect, weak bristles along mesal margin of epandrium; epandrium narrow; body usually tan-colored (Mexico; Arizona) .... *Prolatiforceps* Martin, new genus

Bristles laterally on incisures strong, short, any pile on sternites not abundant; short, semirecumbent strong bristles along mesal margin of epandrium; epandrium broad; usually grayish black species in United States, reddish brown in Mexico and Central America (Holarctic)..... *Machimus* Loew

Genus *ASILUS* Linnaeus

Asilus Linnaeus, 1778. Type-species, *A. crabroniformis* Linnaeus (Latreille, 1810, p. 443).

Many North American Asilini assigned to *Asilus* Linnaeus by Williston (1901, 1908), by Hine (1909), some in the lists of *Asilus* by Hull (1962), by Martin and Wilcox (1965), and by Martin and Papavero (1970), are reassigned to other genera in the present paper.

The characters common to the type-species *Asilus crabroniformis* Linnaeus and the closely related *A. barbarus* Linnaeus are reviewed here to define the genus *Asilus*.

CHARACTERS OF PALEARCTIC *ASILUS*. Length 15-25 mm.; oral margin extends ventrad of eye for length of antennal segment 1, middle of face about the width of one compound eye, oral

margin 1.3 to 1.4 times wider than at the base of the antennae; gibba moderately strong, coarse gibbal bristles on lower half of face; on front laterally coarse bristles; strong occipital bristles; proboscis tapering.

Thorax robust, slightly convex, anteriorly short semi-erect bristles, either only dorsocentrals or both dorsocentrals and acrostichals posterior to transverse suture; disc of scutellum posteriorly with bristles rather dense, weaker and shorter than the strong 2-8 bristles on the posterior margin, a few shorter bristles on posterior margin; posterior humeri with short and long bristles; bristles on metanotal callus coarse, dense, long, erect, with no intermixed hairs.

Hull (1962) stated that the lateral patch of coarse bristles on tergite 2 of *A. crabroniformis*, the type-species of *Asilus*, was "rare" in the genus. It is more logical to assume that the coarse bristle patch is not only one of the characters of the genus *Asilus*, but that species without similar coarse bristles represent other genera.

Many Nearctic genera allied to *Asilus* have laterad on tergite 2 a sparse to more or less dense patch of long but not coarse bristles, or long pile. Some genera have only short recumbent bristles laterally on the tergite.

Asilus crabroniformis has a relatively sparse patch of shorter bristles on tergite 3. *Asilus barbarus* has similar but recumbent patches of bristles on tergites 2 and 3.

Abdomen of both species tapering; no strong erect bristles laterally on incisures; proctiger small, narrow, shorter than epandria, almost uniform in width, a pair of conelike processes at hinge of proctiger; aedeagal sheath cylindrical, apically three slender short tubes.

Ovipositor subcylindrical, abdominal segment 8 with scattered bristles, tergite 10 laterally and apically with short bristles and pile.

Opaque wings similar to those of *Asilus* appear also in other genera.

DISTRIBUTION. Palearctic region.

Nearctic *Asilus sericeus* Say of the eastern United States, which is not congeneric with *A. crabroniformis*, has a weaker gibba; on posterior margin of thorax either sparse short bristles or no bristles, no patches of bristles laterally on tergites 2 and 3; sternites without long bristles; abdomen cylindrical; wings brown with darker brown spots.

Genus *MACHIMUS* Loew

Machimus Loew, 1849. Type-species, *Asilus chrysitis* Meigen, 1820. Designated by Coquillett, 1910.
Tolmerus Loew, 1849. Type-species, *Asilus pyragra* Zeller, 1841. Designated by Coquillett, 1910.
Epitriptus Loew, 1849. Type-species, *Asilus cingulatus* Fabricius, 1781. Designated by Coquillett, 1910.

The ovipositor being strongly compressed laterally separates *Machimus* Loew from *Asilus* with a subcylindrical ovipositor. Also, the bristles of *Machimus* on tergites 2 and 3 are weaker than those of *Asilus*.

REDESCRIPTION. Length 10-28 mm. Gibba covering 2/3 to 7/8 of face, not as coarsely bristled as in *Asilus*, at antennae face narrower than eye width, oral margin extends ventrad of eye for length of antennal segment 1; lateral frontal bristles weak, not as dense as in *Asilus*; proboscis cylindrical, slightly tapering; mesothorax strongly convex, 4-9 pairs of dorsocentral bristles posteriorly; scutellum convex, discal bristles weak, short to long, 2-10 bristles on posterior margin; metanotal callus with dense bristle patch; abdomen cylindrical, slightly tapered, bristles on posterolateral corners of tergites stronger than other vestiture, such bristles on sternites either absent or present; posterior margin of tergite 8 either straight or projecting posteriad forming a more or less triangular point; tergite 10 of ovipositor behind tergite 9, ovipositor strongly compressed laterally; hinge of proctiger with or without either a shelflike process, or spinelike or disclike processes; apically aedeagal sheath three-tubed, of various shapes and lengths; epandria narrow to broad; wings with two submarginal cells, hyaline, deep brown, or with spots in posterior cells; lower branch of longitudinal vein 3 (R_5) ending below wing apex; femora stout.

STATUS OF *TOLMERUS*. In 1849, Loew described *Tolmerus*, *Machimus*, and other related genera. The status of these genera changes from author to author. Osten Sacken (1887) and Williston (1901, 1908) assigned many nearctic species to *Asilus*, but used Loew's 1849 names for subgenera. Williston (1901) misidentified *Machimus*, *Heligmoneura*, *Neoitamus*, and *Philonicus*. Hine (1909) lumped Loew's genera with *Asilus*, using Loew's generic names as group names.

Séguy (1927) synonymized the Palearctic *Epitriptus* Loew with *Tolmerus*, and submerged the latter as a subgenus of *Machimus*. Engel (1928) assigned the palearctic *Machimus*, *Tolmerus*, and *Epitriptus* to his "Machimus-gruppe" without separating the genera. The generic names of Loew were retained in Engel's redescriptions.

Hull (1962) and Martin and Wilcox (1965) used *Machimus* and *Tolmerus* as generic names for North American species. Martin and Papavero (1970) used *Tolmerus* as a subgeneric name in *Machimus*.

V. Ritcher (1968) in her discussion and key to the members of *Machimus* in the Caucasus Mountains referred neither to *Tolmerus* nor to *Epitriptus*. However, her key breaks *Machimus* into two groups, one with a triangular lobe on sternite 8, and a second with the posterior margin either straight or slightly expanded. According to a letter to me, Professor Ritcher (1969) intended to indicate, although not directly stating, that *Tolmerus* is a synonym of *Machimus*.

Ionescu and Weinberg (1971) treated *Tolmerus* as a synonym of *Machimus*.

Further evidence that *Tolmerus* is a synonym of *Machimus* is that the processes at the hinge of the proctiger divide both *Machimus* and *Tolmerus* into the same five groups (see subgroups). The straight and lobed margins of sternite 8 are not generic characters.

THE OCCIDENTALIS, TENEBROSUS, AND TOLMERUS GROUPS

The processes at the hinge of the proctiger and sternite 8 separate the genus *Machimus* in North America into three major groups closely associated with geography. Tsacas (1969) was able to associate five groups of African *Neomochtherus* Osten Sacken with geography.

Key to the Groups in *MACHIMUS*

1. Posterior margin of sternite 8 of male straight; hinge of proctiger with or without processes; aedeagi similar to those of Tenebrosus Group; allopatric in eastern United States, sympatric in western North America with Occidentalis and Tenebrosus Groups ..... Tolmerus Group

   Posterior margin of sternite 8 of male lobed or triangular 2

2(1). No processes at hinge of proctiger; aedeagi variable in shape; center of distribution in California .... Occidentalis Group

   Processes at hinge of proctiger; aedeagi similar from species to species; center of distribution in Mexico .... Tenebrosus Group

Other than the differences in the key, the shorter gibba, and the more slender femora, members of the Tolmerus Group are usually smaller in size than members of the other two groups; the three groups are similar in habitus.

DISTRIBUTION CENTERS. Each of the three groups have different distribution centers (map 1). The eight species

and subspecies of the Occidentalis Group are mostly in the southern half of California; two species are sympatric with the Tenebrosus Group outside California.

Ten of the species in the Tenebrosus Group are Mexican. One species each are in Honduras and Panama. *Machimus adustus* Martin ranges from Arizona to Alberta, Canada. One species is on the Pacific Coast in Occidentalis territory, and two species range from Arizona to Colorado and southward into Sonora, Mexico. *Machimus occidentalis* invades Tenebrosus Group territory in Oregon, Washington, Utah, and Wyoming.

The Tolmerus Group is allopatric with the other groups in the eastern United States, but is sympatric with them in the western United States and in Mexico.

SUBGROUPS

One subgroup has no processes on the hinge of the proctiger, while four subgroups have major types of processes at the hinge or at the apex of the proctiger. These subgroupings divide the three major groups into five subgroups independent of geography. The subgroups help establish the validity of the synonymy of *Tolmerus*.

Subgroup 1. The species in the Occidentalis Group are without processes either on the base or at the hinge of the proctiger. Four species of the Tolmerus Group are without processes.

Subgroup 2. Apicoventrally the proctiger of most species of *Machimus* is smooth, but two species in the Tenebrosus Group and four in the Tolmerus Group have processes on the ventral surface near the apex. *Machimus adustus* Martin (Tenebrosus Group) and *M. callidus* (Williston)(Tolmerus Group) have more or less diamond-shaped, triangular, or cone-shaped projections on the apicoventral surface (figs. 1, 2, 6). In some specimens, the projection appears to be a hood, in others it is solid. *Machimus sadyates* (Walker) has a bizarre triangular projection, which, along with the apex of the proctiger, is thinly compressed longitudinally (fig. 3). *Machimus johnsoni* (Hine) and *M. autumnalis* (Banks) in the Tolmerus Group have a small cone-shaped projection on the apicoventral surface of the proctiger.

The processes at the hinge of the proctiger of Subgroup 2 are either elongate cylinders or large flat plates. In *M. callidus* the cylinders are separated, but are coalesced basally in *M. adustus*. In *M. sadyates* these processes are two large flat hemispheres coalesced basally. *Machimus johnsoni* and *M. autumnalis* have processes which are laterad on the hinge, but are more slender than in *M. callidus* and *M. adustus*.

Subgroup 3. A third subgroup with the ventral surface of the proctiger smooth, and with lateral processes at the hinge, includes eight species in the Tolmerus Group and five in the Tenebrosus Group (fig. 5).

The species of the Tolmerus Group included are *Machimus antimachus* (Walker), *M. cancerae* Martin, *M. grantae* Martin, *M. notatus* (Wiedemann), *M. novaescotia* (Macquart), *M. paropus* (Walker), *M. snowii* (Hine), and *M. virginicus* (Banks).

The species of the Tenebrosus Group included are *M. gertschi* (Bromley), *M. griseus* Hine, *M. sestertius sestertius* Martin, *M. sestertius davidsonae* Martin, *M. sestertius triton* Martin, *M. tenebrosus* (Williston), and *M. ventralis* Martin.

Subgroup 4. Three species in the Tolmerus Group and eight in the Tenebrosus Group have on the hinge of the proctiger a more or less triangular shelflike projection with the median emargination forming a pair of toothlike projections (figs. 8, 9).

The species of the Tolmerus Group included are *Machimus delusus* (Tucker), *M. floridensis* (Bromley), and *M. cerasinus* Martin.

The species of the Tenebrosus Group included are *Machimus acutus* Martin, *M. bromleyanus* (Carrera and D'Andretta), *M. brevis* Martin, *M. niveibarbus* (Bellardi), *M. mcalpinei* Martin, *M. oriens* Martin, *M. painteri* Martin, and *M. truncatus* Martin.

Subgroup 5. The fifth subgroup is a heterogeneous one, including species with several unique characters. *Machimus humilis* (Bellardi)(Tolmerus Group) has a small V-shaped proctiger and on the hinge are two small short lateral spines. *M. submaculus* Martin (Tenebrosus Group) has a V-shaped proctiger and flattened triangular processes medially on the hinge. *M. guttatus* Martin (Tenebrosus Group) has a broad shelflike, V-shaped projection on the hinge of the proctiger, but is without the median emargination of subgroup 4.

IDENTIFICATION OF THE SPECIES OF *MACHIMUS*

The following key to the species of *Machimus* in the western United States, Mexico, and Central America emphasizes male more than female characters. While the female ovipositors differ from species to species, the differences are not as clear cut as with male genital characters.

Key to the Species of *MACHIMUS* in Western United States, Mexico, and Central America

1. Hind femora either black with a red apical band, or longitudinally red and black 5
   Hind femora totally black 2

2(1). Tibiae either totally black or red, with strong black bristles; gibba weak, mostly white-haired; antennal segment 3 broad, black; male and female genitalia black; length 12 mm. (Washington; Oregon)..... ..... *?Asilus platyceras* Hine
Tibiae black, with or without a red band basally; antennae more slender 3

3(2). Tibiae and femora black, vestiture white or yellow except for black tarsal bristles; proctiger small, V-shaped; length 8-11 mm. (Mexico)..... ..... *humilis* (Bellardi)
Tibiae either partly or totally red, hind femora black 4

4(3). Sternite 8 of male triangular; tibiae black, red basally, hind femora 5 times longer than wide; length 13-18 mm. (southern California)..... ..... *occidentalis* (Hine)
Sternite 8 of male straight on posterior margin; tibiae red, hind femora 7 times longer than wide; length 13-15 mm. (Wisconsin; Massachusetts; North Carolina)..... *sadyates* (Walker)

5(1). Hind femora black, each with apical red band 26
Hind femora longitudinally red and black 6

6(5). Hind femora black, red fascia dorsally; black species; length 16 mm. (Mexico) (*incertae sedis*)..... ..... *?Asilus mexicanus* Macquart
Hind femora without red fascia confined to dorsal surface 7

7(6). Wings apically either colored to veins, or color along veins lighter, or hyaline, with or without spots in posterior cells 9
Wings apically and posteriorly hyaline, or pale colored, usually without spots in posterior cells, or any spot pale; length 12 mm. (Mexico) 8

8(7). Thoracic median stripe brown, geminate, lateral stripes indistinct or absent; narrow epandrium pollinose on apical half (Zacatecas)..... ..... *cancerae* Martin, new species

Thoracic median stripe not geminate, coalesced with lateral stripes; epandrium pollinose; length 12 mm. (Michoacán)..... ..... *bromleyanus* (Carrera and D'Andretta)

9(7). Hind femora red, black fascia ventrally; wings apically hyaline along veins; tergites dorsally brownish yellow with brown spots; length 14-15 mm. (Puebla; Morelos; México; Michoacán) ..... *submaculus* Martin, new species

Hind femora red with more extensive black fascia 10

10(9). Wings apically colored to veins, with or without spots in posterior cells 15

Wings apically along veins either hyaline or colored faintly, strong spots in posterior cells 11

11(10). Hind femora ventrally black-haired, fore femora dorsally with short black bristles; tergites 2-5 from oblique anteriad view with blackish brown irregular median spots; epandria polished; length 16-22 mm. (Durango; Guerrero)..... ..... *tenebrosus* (Williston)

Hind femora ventrally white- or yellow-haired, or bare; fore femora dorsally white-haired, with or without recumbent black bristles apically; epandria pollinose or polished 12

12(11). Face brown to yellowish brown; apex of wing brown, paler along veins; thoracic transverse suture narrowly orange-brown tomentose; length 13 mm. (Panama)..... *gertschi* (Bromley)

Face gray to white 13

13(12). Abdomen with brown rings around hair bases; antennal segment 2 dark red; length 14 mm. (southern Mexico)..... ..... *guttatus* Martin, new species

Abdomen without brown rings around hair bases 14

14(13). Front gray; thorax gray and brown; length 14-22 mm. (Arizona to Colorado; Sonora)..... *griseus* Hine

Front reddish brown; thorax reddish brown, transverse suture gray; length 18 mm. (Durango)..... ..... *brevis* Martin, new species

15(10). Tergite background black, sometimes incisures red, or red laterally and posteriorly 17
Tergite background red with either black spots or narrow median longitudinal black stripes 16

16(15). Thoracic background red, median black stripe; broad median stripe brown tomentose; tergite background red with narrow longitudinal median black stripe; length 15-16 mm. (Guerrero)..... *alterus* (Williston)
Thoracic background black, narrowly red laterally, more broadly posteriorly; tergite background red with narrow longitudinal median black spots, yellowish brown pollinose, tergites 2-6 medially with brown tomentose spots; length 13 mm. (México)..... ..... *niveibarbus* (Bellardi)

17(15). Tergite background color totally black, or black with red on posterior margins 19
Tergite background color black, red laterally and posteriorly, anterior sternites red 18

18(17). Thoracic median stripe narrows on posterior declivity; above base of halteres patch of black short bristles; laterally strong black tergal bristles; length 14-15 mm. (Durango)..... ..... *mcalpinei* Martin, new species
Thoracic median stripe ends abruptly below transverse suture; above base of halteres patch of short white bristles; laterally strong white tergal bristles; length 15 mm. (Michoacán)..... ..... *acutus* Martin, new species

19(17). Black fascia of hind femora interrupted apically by red apex 21
Black fascia extend to apex of hind femora 20

20(19). Fore femora 1/2 red and 1/2 black dorsally; face white tomentose; aedeagal lateral tubes shorter than median tube; sternites 2 and 3 with sparse long pile; length 19 mm. (Puebla)..... ..... *cerasinus* Martin, new species

Fore femora totally black dorsally; face yellowish brown tomentose; short recumbent white bristles on sternites; length 14 mm. (México).. ..... *oriens* Martin, new species

21(19). Mystax of mostly white bristles, a few black above and below; looking anteriad, tergites black, posteriorly narrowly yellowish, incisures interrupted medially by dark brown tomentum; length 16 mm. (Morelos).. ..... *truncatus* Martin, new species

Mystax bristles black above, white below 22

22(21). Proctiger with a projection on apicoventral surface; hind femora red ventrally and posteriorly, black anteriorly, 1/2 black dorsally; looking anteriad, tergites dark-banded anteriorly, tergite 2 anteriorly with medially constricted yellow to brown band; length 16-18 mm. (Arizona; Wyoming; Alberta) ... . *adustus* Martin, new species

Proctiger without a projection on apicoventral surface 23

23(22). Hind femora totally red dorsally and anteriorly; tergites 2-3 with broad brown spots, tergites 4-5 at some views yellow with narrow brown spots; length 13-16 mm. (Honduras).. ..... *ventralis* Martin, new species

Hind femora dorsally 1/2 black, 1/2 red, posteriorly red 24

24(23). Hind femora ventrally black-haired, tergites 2-6 with ovoid reddish brown spots with short recumbent black bristles, laterally yellowish gray-brown pollinose with yellowish bristles; length 14-15 mm. (Chiapas; Morelos; Michoacán; Durango; Guerrero) ..... *painteri* Martin, new species

Hind femora ventrally white-haired; abdomen without spots 25

25(24). Rather dense, long yellowish pilelike bristles on sternites 2-4 and tergite 2; antennal segments 1 + 2 about 1.3 times longer than segment 3, segment 1 longer than 2; length 15 mm. (southern California)..... ..... *latapex latapex* Martin, new species & subspecies

Long whitish pilelike bristles on sternites 2-3, sparse; antennal segments 1 + 2 about equal to segment 3, segments 1 and 2 equal in length; length 14 mm. (central California)..... ..... *stanfordae* Martin, new species

26(5). Male sternite 8 with posterior margin a lobe or triangle 28

Male sternite 8 with posterior margin straight; tibiae red, darkened apically 27

27(26). Mystax and gibbal bristles mostly black; fore femora dorsally with mostly recumbent black hair; male genitalia red; length 15 mm. (eastern Oregon).. ..... *grantae* Martin, new species

Mystax bristles white, gibbal bristles black; fore femora dorsally with mostly recumbent white hair; male genitalia black; length 15-20 mm. (western United States)..... ..... *callidus* (Williston)

28(26). Median aedeagal tube 3 times longer than lateral tubes; abdomen grayish white, tergites 3-5 narrowly densely white pollinose along ventral margin; length 14-16 mm. (southern California) ..... *longipenis* Martin, new species

Median aedeagal tube and lateral tubes about equal in length, or median tube shorter 29

29(28). Small species; aedeagal sheath enclosed mostly within an envelopelike structure; length 13 mm. (southern California)..... ..... *coleus* Martin, new species

Small to large species; aedeagal sheath not enclosed in an envelopelike structure 30

30(29). Dististylus not flattened apically 32
Dististylus with the apical margin curving laterad about 90°, forming a flat, shelflike surface 31

31(30). Sternites 5-7 with mostly white weak bristles, some black; fore femora black, red apical ring or red spot dorsally; length 15-16 mm. (southern California)..... ..... *latapex alticolus* Martin, new subspecies
Sternites 5-7 with black weak bristles, most dense on sternite 7; fore femora black, red apical band; length 18 mm. (central California) ..... *latapex convexus* Martin, new subspecies

32(30). Hind tibiae black with red basal band; posterior thoracic declivity with weak white and black or totally black bristles; tergites subshining brown, narrowly gray pollinose on ventral and posterior margins; length 13-15 mm. (southern and central California; central Arizona) ..... *notialis* Martin, new species
Hind tibiae dark red to blackish red anteriorly, red basally, light red or dark red posteriorly 33

33(32). Tergites dorsomedially with densely white pollinose wide stripes, incisures same; dististylus broadly rounded apicoposteriorly, tuft of reddish hair before apex; length 14-18 mm. (western United States; British Columbia)..... ..... *occidentalis* (Hine)
Tergites dorsally reddish brown or gray pollinose, incisures brownish gray; dististylus constricted near apex; aedeagal median tube half as long as lateral tubes (*sestertius* Martin, new species)..... 34

34(33). Wings hyaline; recumbent hair on tergites yellowish white; thorax dorsally grayish with reddish brown median stripe, lateral stripes indistinct; length 14 mm. (northern Arizona; southern Utah)..... .. *sestertius davidsonae* Martin, new subspecies
Wings with brownish spots; recumbent tergal bristles black; length 18-20 mm. 35

35(34). Tergites dorsally brown, laterally margins gray, more narrowly on posterior margins; thorax gray to brown pollinose, lateral spots indistinct (northern California; Nevada; Washington; Montana)..... ..... *sestertius sestertius* Martin, new species & subspecies

Tergites 2-4 mixed gray and brown, posterior margins narrowly densely gray and brown; thorax gray pollinose with distinct lateral brown spots (Santa Barbara Co., California) ..... *sestertius triton* Martin, new subspecies

OCCIDENTALIS GROUP

SUBGROUP 1

Most species of *Machimus* in the Occidentalis Group have a black hind femur with an apical red band, except *M. occidentalis* Hine which has either a black hind femur or one black with a red apical band. The hinge of the proctiger of the 8 species and subspecies in the Occidentalis Group is without processes. One described, five new species, and two new subspecies, are in the Occidentalis Group in the southern two-thirds of California. *Machimus occidentalis* (Hine) is sympatric with *M. sestertius sestertius* Martin (Tenebrosus Group) in northern California, Nevada, Oregon, Washington, and British Columbia, and also with *M. adustus* Martin (Tenebrosus Group) in Colorado and Wyoming. *Machimus s. triton* Martin (Tenebrosus Group) is sympatric with the Occidentalis Group in the coastal areas of southern California. An isolated population of *M. notialis* Martin (Occidentalis Group) is in Oak Creek Canyon in Central Arizona, but the main population is in southern California. *Machimus occidentalis* does not occur in Arizona or in New Mexico.

Machimus occidentalis (Hine).
(Figures 21, 41, 72.)

Asilus occidentalis Hine, 1909, Ann. Ent. Soc. Amer., vol. 2, p. 147.
Machimus occidentalis; Martin and Wilcox, 1965, U. S. Dept. Agriculture, Handbook no. 276, p. 396.

On the ventral margins of the anterior tergites of *M. occidentalis* are roughly horizontal triangular patterns of gray pollen which are more dense than the adjacent pollen. In many species in the Occidentalis Group, the ventral margin of each anterior tergite has a gray or white narrow densely pollinose longitudinal stripe, forming a right angle

with the equally dense partial stripe along the posterior margin of the tergite. The broadly rounded posterior margin of the dististylus with a tuft of usually reddish brown hair near the apex (fig. 21) is unique to *M. occidentalis*. The median aedeagal tube forms an angle of about 30° to the lateral tubes which curl anteroventrad and have slightly bulblike expansions near the apices (fig. 72).

Females of *M. occidentalis* have pollen patterns similar to the males.

COLOR OF HIND FEMORA. Hine (1909) described *Asilus occidentalis* as having black femora with or without a red apical band on each. Those specimens with totally black femora range from northern Baja California, Mexico through California as far north as Sonoma and Plumas counties and from sea level to 10,500 feet elevation in Mono County, California.

The specimens with a red apical band range from Monterey to Inyo counties, California, and northward and eastward into Oregon, Washington, British Columbia, Idaho, Montana, Wyoming, Utah, Colorado, and Nevada. The southern part of their range overlaps the northern part of the black femora phase in a broad band across central California.

Throughout the range of both phases about 4 or 5 percent of the individuals have a red spot usually on the posterior side of each hind femur.

LECTOTYPE. Four of Hine's seven cotypes of *Asilus occidentalis* at the Entomological Museum of Ohio State University have black femora, though the color of two male cotypes from Los Angeles County, California (collected by Coquillett) has faded to blackish red. The male which Hine had from Los Angeles County, California (collected by Coquillett) with the hind femora totally black (in 1969), is hereby designated the lectotype (OHIO). A female cotype with the same data has totally black femora; a second female cotype from Kern County, California (collected by Coquillett) has an apical red band.

One of Hine's cotypes from San Bernardino County, California (collected by Coquillett), which was labeled as *Asilus occidentalis* Hine, proves to be *Machimus notialis* Martin. A second cotype from Calaveras County, California (collected by Coquillett) proves to be *M. latapex convexus* Martin. Both cotypes have black hind femora, each with an apical red band. Both specimens are in the Ohio State University Collections, with both the original cotype labels and my paratype labels.

Machimus latapex Martin, new species.
(Figure 26.)

Three subspecies are recognized, *M. latapex latapex* Martin, *M. latapex alticolus* Martin and *M. latapex convexus* Martin. *Machimus latapex latapex* inhabits the valleys of southern California and is brown tomentose; the others are

both usually high mountain species, and both are gray, black, and brown in color. *Machimus l. latapex* has weak yellowish bristles of uniform density on sternites 5, 6, and 7; *M. l. alticolus* has white pile least dense on sternite 7; *M. l. convexus* has black bristles not dense on sternite 7. All three taxa have a dististylus with the apex bent laterad forming a flat apical surface with a tuft of bristles similar to that of *M. occidentalis* (Hine).

The ranges of *M. latapex latapex* and *M. latapex alticolus* overlap near Palmdale, California. *Machimus l. convexus* is known only from Tuolumne and Calaveras counties, in east central California.

Male. Length 15mm. Yellowish brown; face with grayish bristles, yellowish below, black above; front, vertex, and occiput laterally grayish, occipital disc dark brown.

Thorax yellowish brown tomentose; median stripe dark reddish brown, geminate, terminating on the margin of the mesothoracic brown to gray declivity, median and lateral stripes on declivity.

Abdomen shining black; more thinly brown pollinose dorsally than laterally, yellowish brown incisures; tergites 2-3 with yellowish recumbent hairlike bristles becoming long yellow pile laterally; proctiger without processes at hinge, aedeagal sheath slightly shorter than the twisting lateral aedeagal tubes, all three relatively short.

All femora with apical red bands and red dorsoposteriorly; hind and middle femora black anteriorly and ventrally, fore femora red with black fascia anteriorly, tibiae reddish yellow, darkened anteriorly.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, Alhambra, Los Angeles County, California, 16 July 1936, M. W. Stone (CAS). Paratypes: 1 male, 6 August 1936, M. W. Stone; 1 male, 31 May 1934, M. W. Stone; 2 males, El Monte, Los Angeles Co., 22 May 1934, 12 June 1934, M. W. Stone; 1 male, Monrovia Canyon, Los Angeles Co., 20 July 1930, Chas. H. Martin; 1 male, Palmdale, Los Angeles Co., 17 May 1947, McDonald.

Machimus latapex alticolus Martin, new subspecies.

Male. Length 15 mm. Head black; face grayish tomentose, partly brownish at some angles of view, bare medially, vertex brown and gray tomentose, occiput laterally gray tomentose with some brown, disc dark brown; oral bristles white, gibbal bristles black, dense, occipital bristles strong, black, laterally yellowish, pile white.

Thorax gray and brown mixed, median stripe subshining brown, terminating just beyond transverse suture, divided by narrow grayish stripe, lateral spots subshining brown, divided by brownish gray stripe, a light reddish brown above anterior humeri, posterior declivity gray tomentose, very narrow median black stripe; short black bristles erect, dorsocentrals anterior to transverse suture; scutellum

mostly gray pollinose, posterior margin narrowly densely white tomentose, mixed black and white pile medially, white laterally, six strong black bristles on posterior margin; pleura mixed brown and gray tomentose, more gray posteriorly.

Abdomen dorsally subshining reddish brown pollinose, tergite 2 with anterior margin broadly gray, posterior margin more narrowly, tergite 3 narrowly gray anteriorly and posteriorly, tergite 4 narrowly gray anteriorly except medially, narrowly gray posteriorly, other tergites similar, from a lateral view abdomen gray pollinose except dorsally brown, ventral margin densely gray pollinose, posterior tergal margins densely gray; long yellowish hairs laterally on tergites, medially blackish brown semi-appressed bristles, sternites with sparse yellowish white to white sparse pile, shorter posteriorly.

Wings diffused brown, faint spots in some posterior cells.

Legs shining black; femora with apical red bands, tibiae basally reddish yellow.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, Big Bear Lake, San Bernardino County, California, 6 August 1968, J. Wilcox (CAS). Paratypes: 6 males, 8 females, same data as holotype.

RECORDS. California: Crestline, 1 September 1963, M. W. Stone (CAS); Big Bear Lake, 28 July 1932, R. H. Beamer (KU); Big Bear Lake, Snow Valley, San Bernardino Co., 27 June 1948, J. Wilcox; Palmdale, Los Angeles Co., 17 May 1947, W. A. McDonald; San Jacinto Mts., 21 July 1929, L. D. Anderson; Hannah Flats, Big Bear Lake, San Bernardino Co., 15 August 1963, G. F. Toland; Monrovia Canyon, Los Angeles Co., 20 July 1930, Chas. H. Martin.

Machimus latapex convexus Martin, new subspecies. (Figure 73.)

Machimus latapex convexus has been collected only in the high Sierra Nevada in east central California.

Male. Length 18 mm. Head black; face white tomentose, front gray with a brown spot, vertex and occiput gray tomentose; oral bristles dense, yellowish white, gibbal bristles black, strong occipital bristles black, weak vestiture whitish (antennal segment 3 missing).

Thorax grayish tomentose, tinged with brown, median stripe broad, bifid, brown, lateral spots reddish brown, broadly separated by a gray cross-stripe, anteriorly indistinct brown spots, posterior declivity gray tomentose with paired narrow black stripes on each side; vestiture black except white pile above posterior callus; scutellum gray tomentose, discal pile black, laterally white pile, six black bristles on posterior margin; pleura gray except brown before wing base.

Abdomen black; gray pollinose laterally, a dense narrow white stripe across ventral margins of tergites, dorsally tergites 2 and 3 anteriorly and posteriorly gray, medially a broad subshining reddish brown band, tergites 4-7 brownish pollinose, grayish on incisures; tergite 2 dorsally with long erect black hair anteriorly, appressed posteriorly, tergites 3-7 with short appressed black bristles dorsally, laterally tergites with yellowish pile; pile on sternites 2-4 yellowish white anteriorly, black posteriorly, sternite 7 with black bristles more dense posteriorly, bristles on sternite 8 black, dense.

Wings brownish, a spot in posterior cell 4.

Legs black, apical red bands on femora, tibiae red basally.

Female. Unknown.

TYPE MATERIAL. Holotype: male, Pinecrest, Tuolumne County, California, 27 August 1947, P. H. Arnaud, Jr. (CAS). Paratype: 1 male, Calaveras Co., California, Coquillett. Hine's cotype of *Machimus occidentalis* is a paratype of this species.

Paratype with fewer black hairs on sternite 5 than on the holotype.

Machimus notialis Martin, new species.
(Figure 13.)

The phase of *Machimus occidentalis* with totally black hind femora is sympatric with *M. notialis* Martin which has an apical red band. From a dorsal view, the tergites of *M. notialis* are extensively subshining reddish brown with gray posterior margins. In *M. occidentalis*, from the dorsal view the tergites are densely gray and brown tomentose.

Male. Length 16 mm. Head black; face gray tomentose, front subshining gray tomentose, vertex and occiput grayish white tomentose, disc of occiput blackish brown; dense white bristles on oral margin, black bristles on gibba more sparse, antennal vestiture black, strong occipital bristles black, weaker vestiture white; antennal segment 3 reddish brown tomentose, segment 1 longer than segment 2.

Thorax black except a small red spot on anterior and posterior calli; gray pollinose, median bifid stripe dark brown, grayish brown lateral spots; vestiture black except whitish pile laterally; scutellum gray tomentose, white pile on disc, five long black bristles on posterior margin; pleura thinly gray tomentose.

Abdomen black, incisures reddish, gray pollinose from a lateral view, from a dorsal view tergites subshining reddish brown pollinose, narrowly gray posterolaterally, at some views densely brown pollinose; vestiture dorsally black, laterally and lateroposteriorly white; median aedeagal tube about 4/5 as long as lateral tubes which form angles of about 45° from the median tube, dististylus constricted near the oblique apex.

Wings tinged yellowish brown, without spots.

TYPE MATERIAL. Holotype: male, Big Bear Lake, San Bernardino County, California, 8 August 1968, J. Wilcox (CAS). Paratypes: California: 2 pairs in copula, Big Bear Lake, 17 August 1967, 10 August 1968, J. Wilcox; 12 males, 5 females, same data as holotype, 6-27 August 1951, 1967, 1968, J. Wilcox; 2 males, Big Bear Lake, Hannah Flats, 31 July 1949, 13 August 1951, Chas. H. Martin; 8 males, Barton Flats, San Bernardino Co., June-August 1936-1966, J. Wilcox; 12 males, South Fork Camp Ground, 8000 ft., San Bernardino Co., July-August 1941-1964, J. Wilcox; 1 male cotype of *Machimus occidentalis* (Hine), San Bernardino Co., Coquillett (OHIO).

RECORDS. California: Idyllwild, San Jacinto Mts., 30 June 1933, R. H. Beamer; Pinyon Flat, Riverside Co., 11 May 1953, Dorothy W. Martin; Bigpine, Glacier Lodge, 8500 ft., July 1957, J. Wilcox. Arizona: Oak Creek Canyon, Slide Rock Camp, 21 June 1949, Dorothy W. Martin; Oak Creek Canyon, 29 May 1963, J. Wilcox.

Machimus stanfordae Martin, new species.
(Figure 24.)

Machimus stanfordae and *M. latapex latapex* Martin are the only taxa in the Occidentalis Group with red longitudinal posterior fascia and an apical red band on the hind femur. Both species have a brown thorax, but only *M. stanfordae* has a gray posterior callus. The dististylus of *M. stanfordae* is narrow, apex thickened.

Male. Length 16 mm. Head black; face whitish tomentose, front, vertex, and occiput light reddish brown, narrowly brownish gray around eyes on occiput; bristles on oral margin yellowish white, on gibba black, mixed black and white vestiture on antennal segment 1, black on segment 2, strong occipital bristles black, pile yellowish white; antennal segment 3 reddish brown tomentose.

Thorax black; brown tomentose, gray tomentose on posterior calli, transverse suture gray mesad, median stripe dark reddish brown, broad, bifid, terminating on the grayish brown posterior declivity, brown lateral spots; vestiture black, recumbent bristles short, dorsocentral bristles terminate one bristle anteriad to transverse suture; scutellum gray, medially some brown intermixed, four strong bristles on posterior margin, disc with weak pale and black bristles; pleura brown tomentose anteriorly, gray posteriorly; anterior four coxae brown tomentose, posterior coxae brown with smaller amounts of gray.

Abdomen brown pollinose, tergite 2 gray anteriorly, light grayish brown on incisures, tergite 3 gray latero-anteriorly, tergites 2 and 3 narrowly gray on ventral margins; dorsally short appressed bristles black, laterally long pale bristles; aedeagal median tube subequal to lateral tubes.

Wings diffused with brown, more intensely apically.

Fore femora reddish dorsally, tibiae reddish with darkened median band.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, Stanford University, Santa Clara County, California, 27 July 1949, P. H. Arnaud, Jr. (CAS). Paratypes: 17 males, 3 females, same data as holotype.

Miscellaneous Species in Subgroup 1

The Occidentalis Group also includes *Machimus longipenis* Martin, which has its center of distribution in the San Rafael Mountains, Ventura County, California. A second unnamed species collected at McGrath Lake, 9 July 1948, M. W. Stone (WIL), is closely related to *M. longipenis*; the latter has a median aedeagal tube over twice as long as the lateral tubes. The unnamed species has lateral aedeagal tubes as long as its own very long median tube. *Machimus coleus* Martin is unique among the species of *Machimus* in having the median and lateral aedeagal tubes partially covered by an envelopelike structure. Its distribution is limited to near the mountains in Los Angeles County, California.

Machimus longipenis Martin, new species.
(Figure 11.)

Abdomen grayish white, narrowly grayish white along ventral margins of tergites; median aedeagal tube about 2.5 times longer than lateral tubes.

Male. Length 16 mm. Face grayish white tomentose, some pale brown intermixed.

Thorax whitish gray pollinose, median stripe reddish brown, geminate, a single narrow median stripe on posterior declivity of mesothorax; thoracic vestiture similar to *M. occidentalis* except long pile on posterior declivity white instead of black; scutellum similar to *M. occidentalis*.

Abdomen gray pollinose, blackish gray dorsally, narrow grayish white bands along ventral margins of tergites 3-5; short recumbent yellowish bristles on tergites laterally, black dorsally; aedeagal median tube about 2.5 to 3 times longer than lateral tubes.

Wings light yellowish brown.

Legs shining black, all femora with red apical bands.

Female. Similar to male, including the narrow grayish white bands along the ventral margins of tergites 3-5.

TYPE MATERIAL. Holotype: male, Ozena Forestry Camp, upper Cuyama River, Ventura County, California, 22 June 1967, C. W. Kirkwood (CAS). Allotype: same locality, 10 June 1963, C. W. Kirkwood (CAS). Paratypes: only the males with the aedeagus extended to expose the lateral aedeagal tubes are selected for paratypes; same locality as holotype, 3 males, 4 females, 9, 15, 19, 24 June 1963; 4 males, 1 female, 3, 6, 12 July 1964; 11 males, 22, 23, 27 June 1957, C. W. Kirkwood.

At hand are 315 specimens of *Machimus longipenis* collected at the type-locality, Ozena Forestry Camp, Upper Cuyama, San Rafael Mts., Ventura Co., California. Table 1 shows that in this area, of the 335 *Machimus* collected from May 3 to July 12, 94 percent are *M. longipenis* and 6 percent are *M. occidentalis*.

In southern California in the counties of Los Angeles, Riverside, Santa Barbara, San Bernardino, and San Diego, only one to three specimens of *M. longipenis* have been collected in any one locality over a period of approximately 40 years.

Machimus coleus Martin, new species.
(Figure 70.)

Machimus coleus Martin (coleus: sheath) differs from all other North American species of *Machimus* in having the aedeagal sheath and lateral tubes enclosed within a sheath and with their apices extending above the apex of the sheath.

Male. Length 15 mm. Head similar to *Machimus occidentalis* (Hine).

Thorax black; gray pollinose, dark reddish brown median stripes geminate, terminating on posterior declivity, pale reddish brown lateral spots, on posterior declivity a narrow median brown stripe and broader lateral ones, from a lateral view anterior on median stripe rather long reclinate black hairs, longer and more sparse mixed pale and dark vestiture posteriorly, four long weak bristles on posterior margin of scutellum; pleura gray tomentose.

Abdomen densely gray from a lateral view, tergite 2 without patterns laterally, tergites 2-4 laterally above incisures with small reddish brown indistinct spots, from a dorsal view tergites subshining brown pollinose, lateroposterior corners with whitish gray spots; proctiger without processes at hinge; median aedeagal tube and lateral tubes enclosed within a case with a fringe of long yellow hair ventrally, the apices of the tubes extending above the case, median tube extending posteriad, and lateral tubes twisting laterad (fig. 70); dististylus constricted near apex.

Wings with reddish brown spots in cells.

Femora black with red apical bands; tibiae black, basal third reddish yellow.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, Azusa, Los Angeles County, California, 27 April 1959, J. Wilcox, dististylus and epandrium on a plastic mount, aedeagal sheath exposed to view (CAS). Paratypes: California: 5 males, Azusa, Los Angeles Co., 28 April 1941, J. Wilcox; 4 females, same locality, 27 April 1959; 5 males, 3 females, Claremont, Los Angeles Co., Baker; 1 male, near Pasadena, 1200 ft., Los Angeles Co., 5 May 1910, F. Grinell, Jr.; 1 male, Newton, 11 July 1956, D. J. Knull (OHIO).

TENEBROSUS GROUP

In the Tenebrosus Group are 16 species and two subspecies with several types of processes at the base of the proctiger. Most of the species in the group are Mexican.

SUBGROUP 2

Machimus adustus Martin, new species.
(Figures 1, 12, 35.)

Asilus avidus of authors, nec Wulp, 1869, p. 82 (*Asilus*).
Machimus avidus; Martin and Wilcox, 1965, U. S. Dept. Agriculture, Handbook no. 276, p. 396. Misidentification.

Machimus adustus Martin, ranging from Arizona to Alberta, has been frequently misidentified as *M. avidus* (Wulp), a synonym of *M. sadyates* (Walker). Strickland (1938), in Canada, misidentified *M. adustus* as *M. paropus* (Walker). Adisoemarto (1967) followed Strickland.

Machimus adustus and *M. callidus* (Williston)(Tolmerus Group) are the only western species with a triangular cap or conical structure apicoventrally on the proctiger.

Male. Length 17 mm. Head black; face grayish white tomentose; front and vertex brownish gray and occiput gray tomentose; bristles on oral margin white, on gibba black and white, antennal vestiture black and white; antennae black, segment 3 narrowly red at base, antennal segment 2 subequal to segment 1, segment 3 slightly longer than segments 1 + 2.

Thorax black, anterior humeri each with a small red spot, posterior humeri red; gray tomentose, median stripe abruptly narrowing on posterior declivity, reddish brown, two indistinct lateral spots separated by a gray line; anterior humeri with long yellowish pile anteriorly; scutellum gray tomentose, sparse erect pile on disc, posterior margin with short close-set yellowish hairs, four long black bristles; pleura black, mostly brown tomentose, some gray, yellow pile sparse, hypopleural bristles yellow, dense patch of yellowish bristles on the metanotal callus.

Abdomen black; from a lateral view bare elongate areas just above the brownish stripe on the lateral margin, dorsally brown tomentose, incisures laterally gray to yellowish brown, giving abdomen a black and whitish striped appearance at some angles of view; dense recumbent long yellow hairs; dististylus obliquely truncate.

Wings palely infuscated.

Legs black dorsoanteriorly and red ventroposteriorly.

Female. Similar to male; ovipositor longer than segments 6 and 7 together.

TYPE MATERIAL. Holotype: male, White Mountains, Bee Hive Springs, Arizona, 18 July 1949, Chas. H. Martin (CAS). Allotype: female, on same pin as holotype (CAS). Paratypes: Arizona: 1 pair, 13 males, 3 females, same locality as

holotype, 11-18 July 1949, Dorothy W. Martin, Chas. H. Martin; 5 males, 1 female, White Mts., Greer, 11 August 1949, Dorothy W. Martin, Chas. H. Martin; 2 males, Mt. Lemmon, 16 July 1949, Dorothy W. Martin; 1 male, Pinal Mt., lower summit, 12 July 1949, Chas. H. Martin; 9 males, 3 females, McNary, 9-10 July 1948, Dorothy W. Martin, Chas. H. Martin; 2 males, Pinetop, 8 August 1948, Chas. H. Martin. New Mexico: 2 pairs, 8 males, Taos-Colfax county line, 30 July 1948, Dorothy W. Martin, Chas. H. Martin. Colorado: 3 males, Manitou Park, 8 August 1961, R. G. Lavigne (WYO). Wyoming: 3 males, 2 females, S. Pinedale, on sage brush, 24-29 July 1964, R. G. Lavigne (WYO); 1 male, West Entrance, Targhee Forest, Teton Co., 8 August 1967, R. G. Lavigne; 1 male, Pole Mt., Albany Co., 10 July 1960, R. G. Lavigne (WYO).

RECORDS. United States: Arizona: Chiricahua Mts., 3 July 1947, A. C. Michener; 29 July 1950, R. H. Beamer; San Francisco Mts., 25 June 1950, L. D. Beamer; Santa Catalina Mts., 15 July 1950, L. D. Beamer. Colorado: Estes Park, July 1892, F. H. Snow; Gregory Canyon, Boulder, 10 July 1949, R. H. Beamer; Manitou Park, August, F. H. Snow. New Mexico: Magdalena Mts., August 1894, F. H. Snow; Sapella, 19 July 1952, R. H. Beamer; Tajique, 25 June 1941, E. L. Todd. Canada: Alberta: Edmonton, 24 July 1941, E. H. Strickland.

REMARKS. The face of *Machimus adustus* is usually grayish tomentose, but it is nearly white in a few specimens. The triangular projection on the ventral side of the proctiger is not present in one specimen; on a few specimens it is a cone or a weak swelling rather than the normal triangular projection. The thorax and tergites are usually grayish posteriorly and laterally, but are whiter in some specimens.

SUBGROUP 3

Machimus gertschi (Bromley), new combination.
(Figure 39.)

Asilus gertschi Bromley, 1951, Amer. Mus. Novitates, no. 1532, p. 33.

The seven type-specimens of *Machimus gertschi* (Bromley) are tobacco brown and yellow rather than pale grayish brown as Bromley (1951) described. Anterior thoracic calli with long white pile and a few black bristles, posterior calli gray; stong dorsocentrals reach transverse suture, no pile on posterior declivity; anterolateral white spots on tergites more apparent at some views than at others; the broad red epandria densely brown pollinose apically, less densely basally; proctiger laterally at hinge with short processes; median aedeagal tube slightly longer than lateral tubes.

Hine (OHIO) misidentified specimens of this species as *Asilus tenebrosus* Williston.

DISTRIBUTION. Panama: Type-locality Boquette, Chiriqui Province, 7-30 March 1923, F. M. Gaige (OHIO; MICH). Chiriqui Province, El Volcan, 18-21 February 1936, W. J. Gertsch.

Machimus griseus Hine.
(Figures 5, 30, 38.)

Machimus griseus Hine, 1907, Ohio Naturalist, vol. 7, p. 29.
Asilus griseus; Hine, 1909, Ann. Ent. Soc. Amer., vol. 2, p. 246. Synonym of *A. tenebrosus* Williston.
Machimus griseus; Martin and Wilcox, 1965, U. S. Dept. Agriculture, Handbook no. 276, p. 396.

Hine described *Machimus griseus* from Colorado in 1907. Two years later he synonymized *M. griseus* with *Asilus tenebrosus* Williston, repeating his *M. griseus* description as that of *A. tenebrosus*.

Studies of a series of 43 specimens of *M. griseus* and 55 of *M. tenebrosus* (Williston) show that the two taxa could be sibling species or subspecies. Each has characters of its own. There are not sufficient geographical data to establish *M. griseus* as a subspecies.

Machimus griseus has wings and legs similar to those of *M. tenebrosus* except the black fascia of the hind femora do not encroach on the apical red band as they do in *M. tenebrosus*. The thorax and pleura of *M. griseus* are much grayer than in *M. tenebrosus*; the latter is more coppery. The median thoracic stripe of *M. tenebrosus* is broader than that of *M. griseus*. The ovoid spots of tergites 2-4 of *M. tenebrosus* are more distinct than the narrow linear spots of *M. griseus*. The sternites of *M. griseus* are gray, of *M. tenebrosus* brown. The red epandria of *M. griseus* are broader than those of *M. tenebrosus*. The lateral aedeagal tubes of both species bend laterad and twist. There is a narrow overlap in the color of the short recumbent bristles on the ventral sides of the femora; 48 of 55 specimens of *M. tenebrosus* have either black or partially black bristles, while 35 of 43 specimens of *M. griseus* have the same bristles totally white. In *M. griseus* 90 percent of the specimens have gray tomentose coxae; in *M. tenebrosus* nearly 100 percent have brown tomentose coxae.

DISTRIBUTION. Arizona, New Mexico, and Colorado. New state record: Frijole, Texas, 15 July 1933, W. Benedict (KU).

Machimus sestertius Martin, new species.
(Figures 15, 69.)

The specific name, sestertius = 2 1/2, refers to the median aedeagal tube being half as long as the broad, ovoid lateral tubes. *Machimus sestertius sestertius* ranges from central California and Nevada to Washington and Montana.

Two allied subspecies, *Machimus s. triton* Martin, a coastal subspecies in southern California, and *M. s. davidsonae* Martin, a desert subspecies in Arizona and Utah, have similar aedeagi. Present records indicate that the three taxa are allopatric, yet all three taxa have the same type of processes at the base of the proctiger. The unique aedeagal sheath is dissimilar to the other 15 species in the Tenebrosus Group, but sternite 8 and the processes at the hinge of the proctiger put the three *M. sestertius* taxa in the Tenebrosus Group.

Male. Length 17 mm. Face strongly gibbous, black; gray tomentose with a slight brownish tinge, between gibbal bristles brown tomentose, front brownish, occiput brownish gray; oral bristles white, gibbal bristles white below, black above, antennal, frontal, and strong occipital bristles mixed yellow and black, pile on occiput white; antennae black, segment 2 subequal to 1, segment 3 equal to length of segments 1 + 2, style subequal to segment 3.

Thorax black, small red spot on anterior humeri, posterior humeri dark cherry red; gray tomentose, median stripe broad, brown, separated by a narrow gray stripe, ending abruptly just beyond transverse suture, lateral spots indistinct, brown, anterior humeri with long white hair, scutellum with a few weak black bristles on posterior margin; pleura black, gray tomentose with some brown, vestiture white.

Abdomen black; from above tergites reddish brown tomentose, tergite 1 mostly gray, tergites 2-4 light brownish gray anteriorly and posteriorly, gray laterally, anterior margin of tergite 2 broadly gray; dorsally vestiture black except strong yellow bristles posterolaterally on tergites 2 and 3, laterally vestiture white; epandria rather narrow, tapering to a blunt point, polished black; ventral surface of proctiger smooth, dististylus constricted near apex, apicoanterior and apicoposterior angles swollen.

Wings infuscated apically, a spot on posterior cell 4.

Femora black with an apical red band on each, tibiae red, darkened anteriorly.

TYPE MATERIAL. Holotype: male, Seneca, Grant County, Oregon, 28 August 1946, Chas. H. Martin (CAS). Allotype: female, Antelope Mountain, Grant County, Oregon, elevation 6500 ft., 12 August 1932, D. K. Frewing (CAS). Paratypes: Oregon: 4 males, 2 females, same data as allotype, 2-12 August 1932; 4 males, 2 females, North Fork Malheur River, 4400 ft., Harney Co., 8-11 August 1932, D. K. Frewing (WIL); 2 males, Strawberry Mt., 8600 ft., Grant Co., 23 August 1932, D. K. Frewing; 1 male, Paulina Creek, 10 mi. NE. Lapine, Deschutes Co., 6 August 1958, J. D. Lattin; 1 male, Grizzly Butte, 18 August 1939, Schuh and Gray; 1 male, Dairy, Klamath Co., 7 August 1946, Chas. H. Martin; 1 male, Portland, 14 July 1940, Schuh and Gray; 2 males, 1 female, 2 mi. NW. Suver, Polk Co., 10 August 1968, E. M. Fisher; 3 males, 1 female, 3 mi. E. Idanha, 2100 ft., Marion Co., 21 July 1968, E. M. and J. L. Fisher; 1 male, Jump-off Creek, U. S.

Highway 5, Josephine Co., 12 July 1968, E. M. Fisher. Nevada: Carson City, 9 August 1929, L. D. Anderson (KU); 1 male, Lehman Creek, 21 July 1957, E. M. and R. H. Painter. California: 2 males, Herkey Creek, 21 July 1930, R. H. Painter, T. F. Winburn; 16 males, 11 females, Marin Co., 5-30 August 1967; 1 male, 11 October 1967, P. H. Arnaud, Jr.; 1 male, Pinnacles National Monument, San Benito Co., 26 June 1967, P. S. Bartholomew.

Machimus sestertius triton Martin, new subspecies.

Machimus sestertius triton Martin is a subspecies isolated in the coastal region of southern California, ranging from Orange to Santa Barbara counties. As in *M. s. davidsonae*, the lateral aedeagal tubes of some specimens appear to have collapsed, forming loops. This tendency is stronger in *M. s. triton* than in *M. s. davidsonae*. The abdomen from a dorsal view is subshining brown with a narrow gray band across the posterior margins of the tergites.

Male. Length 15 mm. Face gray, front brown, narrowly gray along lateral margins, vertex and occiput gray tomentose; bristles on oral margin dense, white, on strong gibba brownish black, dense; antennal and frontal vestiture black, occipital bristles black, antennae brown tomentose, segment 3 shorter than segments 1 + 2, style shorter than segment 3.

Thorax gray tomentose, median stripe dark reddish brown, geminate, terminating below transverse suture, anteriorly elongate narrow brown spot below median stripe, indistinct lateral spots pale brown, separated by a transverse narrow gray line; vestiture black except laterally gray pile, dorsocentrals extend four bristles anteriad to transverse suture; scutellum gray tomentose with long white pile, four strong black bristles on posterior margin; pleura mixed brown and gray tomentose.

Abdomen from dorsal view subshining black, with a thin mixture of brown and gray pollen; tergites lateroposteriorly with strong black and white bristles, short recumbent bristles black; male genitalia similar to *M. s. sestertius*.

Wings densely reddish brown apically, spots in posterior cells.

Legs shining black, femora with apical red bands, tibiae red basally, fore femora ventrally with long white pile on posterior 5/8, anteriorly both long black and white pile.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, Figueroa Mountain, Santa Barbara County, California, 1 July 1965, C. W. Kirkwood (CAS). Paratypes: 15 males, 25 females, same data as holotype, 17 June - 1 July 1965; 1 male, Dana Point, Orange Co., California, 22 May 1963, J. Wilcox.

RECORDS. Oso Fisco Lake, San Luis Obispo Co., California, 13 July 1959, R. W. Spora (UCD).

REMARKS. The amount of brown and gray on the tergites varies from specimen to specimen, usually there is a narrow

gray band across the posterior margin of the tergites. The median and lateral aedeagal tubes tend to form loops.

Machimus sestertius davidsonae Martin, new subspecies.

Machimus sestertius davidsonae Martin, a northwestern Arizona and southwestern Utah desert subspecies with hyaline wings and a densely gray pollinose body that is smaller than *M. s. sestertius*, most specimens measuring 13-14 mm. in length.

Male. Length 14 mm. Body black, a small polished red spot above thoracic spiracle 1; face gray tomentose, brown tinged laterally and above gibba, front and occiput grayish tomentose; vestiture of head white; antennae black, segment 1 nearly twice as long as 2, segment 3 subequal to segments 1 + 2, style subequal to segment 3.

Thorax gray tomentose, median stripe brown, broad, geminate, terminating where white pile begins, posterior declivity with a narrow brown median stripe, dorsolaterally thinly brownish gray maculae separated by a narrow gray cross-line; anteriorly recumbent black bristles, posteriorly vestiture white, dorsocentrals extending one bristle anteriad of transverse suture; scutellum gray tomentose, slightly brownish at some angles, vestiture white, three bristles on posterior margin; pleura gray, white vestiture; metanotal calli with white bristles.

Abdomen from above uniformly gray with a brownish tinge, from an oblique view thinly gray pollinose on black, incisures densely gray pollinose; vestiture white, tergites 2-5 with as many as four strong bristles on posterolateral corners; sternites 3-4 with bristles stronger than pile on posterior margins; sternite 8 extending posteriad, broadly rounded, bristles relatively sparse. Epandrium long, narrow, curved ventroapically, polished, vestiture white, proctiger at hinge with two lateral conical processes, ventral surface polished, dististylus broader apically than medially, obliquely truncate, aedeagal sheath similar to *M. s. sestertius*.

Wings hyaline, about as long as abdomen.

All femora black, with apical red bands, tibiae reddish, darkened apically and laterally; vestiture white, fore femora with weak long white pile over posterior halves.

Female. Similar to male, tergites 2-6 with strong white bristles on posterior margins; tergites 8-10 polished; four strong bristles on posterior margin of scutellum.

TYPE MATERIAL. Holotype: male, 4.5 miles east of Moenkopi, Coconino County, Arizona, 14 July 1966 [on *Paliomintha incana* (Torr.)(Gray)], J. H. Davidson, M. Cazier (CAS). Allotype: female, same data as holotype. Paratypes: 34 males, two pairs in copula, 15 females, same data as holotype.

RECORDS. Arizona: Hualapa Mts., 6000 ft., 4 June 1962, J. Wilcox. Utah: 10 mi. N. Knab, 2 June 1963, J. Wilcox;

Coral Pink Sands, Kane Co., 4 August 1967, J. M. Davidson and M. Cazier; 1 female, Dugway Proving Grounds, 25 June 1953, J. L. Easton.

Eighty-seven percent of the 60 Utah specimens have the thoracic posterior bristles mostly black, 13 percent have intermixed black and white bristles. Eighty-seven percent of 130 specimens from Coconino County, Arizona, have mostly white thoracic bristles, 13 percent have mixed black and white bristles. There are no differences between the male genitalia of the two groups.

The subspecies is named for the J. M. Davidsons of Phoenix, Arizona.

Machimus tenebrosus (Williston).
(Figure 14.)

Asilus tenebrosus Williston, 1901, Biologia Centrali-Americana, Diptera, Suppl., p. 328.
Machimus tenebrosus; Martin and Wilcox, 1965, U. S. Dept. Agriculture, Handbook no. 276, p. 396.
Machimus tenebrosus; Martin and Papavero, 1970, Catalogue of the Diptera of the Americas South of the United States. Museu de Zoologia, Universidade de São Paulo, fasc. 35b, Family Asilidae, p. 86.

Four syntypes of *Machimus tenebrosus* (Williston) are at the British Museum (Natural History) and four at the American Museum of Natural History. Williston (1901) notes two sizes of specimens. I found one syntype to be *M. alterus* (Williston), not *M. tenebrosus* as labeled. The syntypes are from Omilteme, Guerrero, Mexico, 8000 feet elevation.

At hand is a series of *Machimus tenebrosus* collected from 7000 to 9000 feet elevation in Durango State, Mexico by F. F. Alpine (CNM). These specimens and the syntypes show *M. tenebrosus* to be one of the largest of the Nearctic species of *Machimus*, the length ranging from 16 to 22 mm.

The face of *Machimus tenebrosus* is yellow; in some specimens at certain angles of view a brownish spot appears on the upper margin of the either gray or yellow gibba. Face gray in some specimens.

The thorax is orange-yellow, the broad blackish brown median stripe terminates on the posterior declivity; when the specimen is held at an angle the declivity appears to be bright yellow medially, lateral light brown spots becoming yellow at other angles of view; scutellum shifts from brown medially and yellowish laterally to totally yellow; two bristles on scutellar posterior margin.

The color of the tergites shifts from orange-yellow with median brown spots to broadly brown dorsally with yellow incisures.

Wings hyaline basally, tinged yellowish brown apically, clear along veins except at the margins of the apex.

Hind femora red, anterior and ventral black fascia, the

ventral fascia covering more of the apical red band than the anterior fascia.

Dististylus of *M. tenebrosus* is similar to that of *M. griseus* (Hine) and *M. brevis* Martin. The apices of the lateral aedeagal tubes are longer than the median tubes, the former bending laterad and twisting upward as in the syntype males. The epandrium is similar to that of the syntypes, being red, polished, with a straight ventral margin, rounded apicoventrally, and often slightly expanded on the ventro-apical corner.

RECORDS. Omilteme, Guerrero, Mexico, 8000 ft., the type-locality. DISTRIBUTION. Durango State, Mexico, Mexican Highway 40, from 7000 to 9000 ft., 10 June - 26 July 1964 (CNM).

Machimus ventralis Martin, new species.
(Figures 28, 42.)

Machimus ventralis Martin has a median brown thoracic stripe, extending across the scutellum; generally a brownish species.

Male. Length 16 mm. Head black; face grayish tomentose, oral margin reddish brown laterally, front and vertex brown tomentose with some gray, orbitals of occiput gray, disc brown tomentose; bristles on oral margin white and black, gibbal bristles strong, black, antennal vestiture black, a few white hairs, occipital bristles black; antennae black, segment 2 subequal to segment 1, antennal segment 3 twice as long as segment 1, style subequal to segment 3.

Thorax black, small area of anterior humeri red, posterior humeri red; from above thorax brownish anteriorly, grayish posteriorly, median stripe broad, reddish brown, extending across scutellum, lateral stripes lighter brown, coalescing with median stripe; vestiture black, sparse white pile posteriorly; scutellum thinly blackish pollinose, narrowly gray around margin, patches of short erect black bristles on disc, two strong black bristles on posterior margin; pleura black, reddish brown tomentose.

Abdomen black; yellowish brown tomentose, from above tergite 2 with two dark bands across anterior margin, large blackish spot posteriorly, from a posterior view tergites 3-7 with dorsal area black, from a lateral view brownish tomentose, tergite 2 with a dark brown longitudinal stripe across the lateral margin, a short median stripe just above it, when viewed at correct angle tergites 3-7 with longitudinal blackish brown stripes above the lateral margin; heavy yellow bristles laterally, dark brown medially; male genitalia polished dark red, sparse yellow hair, dististylus about 2.6 times longer than the greatest width, rounded apically; proctigeral hinge laterally with triangular processes abruptly constricted to long narrow processes.

Wings uniformly infuscated at apex, spots on four posterior cells.

Legs red, hind femora with black fascia anteriorly and ventrally, not reaching the dorsal surface, tibiae red with black apices.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, El Zamorano, Francisco Morazán, Honduras, 8 July 1965, Mt. Uyuca, cloud forest, 6000 feet elevation, P. H. Freytag, L. P. Gibson (OHIO). Allotype: female, same data as holotype. Paratypes: Guatemala: S. P. Yepocapa Cimal, 4800 ft., 10 May 1948, R. L. Wenzel (CMNH); Dept. Morazán, Cerro, Uyuca, 5900-6100 ft., cloud forest, 24 July 1948, T. H. Hubbell (MICH). Paratypes are 13 mm. in length.

SUBGROUP 4

Machimus acutus Martin, new species.
(Figures 8, 23.)

Male. Length 15 mm. Head black; face grayish tomentose laterally, below antennae brownish gray, front gray, occiput gray tomentose with a brownish tinge on disc; mystax bristles yellowish white, gibbal bristles black, frontal bristles mostly black, occipital bristles black dorsally, white laterally.

Thorax black, calli red; from a dorsal view light brown tomentose, median stripe dark brown terminating on posterior declivity, laterally and anteriorly a brownish white spot, posterior calli grayish tomentose; vestiture black except pale bristles posteriorly; scutellum pale reddish brown pollinose, a pair of black bristles posteriorly; scutellum pale reddish brown tomentose, a pair of black bristles posteriorly; pleural ground color black anteriorly, red posteriorly, anteriorly gray to brownish tomentose above coxa, brown tomentose before wing base, posteriorly white tomentose, vestiture yellowish.

Tergites black with lateral margins red, incisures red, sternites red; from a dorsal view tergites brownish pollinose with dark brown median spots, incisures laterally pale brown pollinose, from a lateral view a pale yellowish brown stripe on tergites ventrally, just above thinly pollinose stripes appearing black from some views, laterodorsally various shades of darker browns; vestiture mostly yellow with a few blackish recumbent bristles on median dark spots; epandrium red, thinly pollinose, denser apically, apical two-thirds angles upward, a heavy black bristle ventroapically, at hinge of proctiger a shelflike projection with a pair of small triangular teeth medially, dististylus tapers to a blunt point.

Wings tinged brownish, posterior cell 4 with a faint spot.

Hind femora black anteroventrally, some encroachment of black dorsally, dorsoposteriorly red, some encroachment of red ventrally.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, 3 miles east of Carapan, Michoacán, Mexico, 10 July 1963, F. D. Parker, L. A. Stange (UCD). Allotype: same data as holotype.

Machimus bromleyanus (Carrera and D'Andretta).
(Figure 34.)

Asilus bromleyanus Carrera and D'Andretta, 1950, Papéis Avulsos, no. 9, p. 179.
Machimus bromleyanus; Martin and Papavero, 1970, Catalogue of the Diptera of the Americas South of the United States, Museu de Zoologia, Universidade de São Paulo, fasc. 35b, Family Asilidae, p. 86.

REDESCRIPTION. *Male paratype.* Length 11 mm. Body black except thoracic calli red; face brownish yellow tomentose, brownish on gibba and below antennal bases, front gray and brown tomentose, occiput grayish brown tomentose; mystax yellowish white, gibbal bristles black, upper occipital bristles strong, black, laterally whitish.

Thorax yellowish white and pale brown tomentose, median stripe blackish brown extending to scutellum, lateral stripes blackish brown, separated from median stripe by a whitish yellow to grayish stripe; scutellum blackish, a narrow whitish line around borders, a pair of long black bristles on posterior margin; pleura mixed reddish brown and yellowish brown tomentose.

Abdomen from a lateral view with a grayish white line along ventral margins of tergites 2-5, above it a coppery narrow line, dorsolaterally mostly reddish brown, incisures same color, sternites about the same color as tergites dorsally, sternite 8 triangular; epandrium red, broad, truncate, brown pollinose, a shelflike projection at hinge of proctiger with a pair of short triangular mesal spines, aedeagus trifid, apically tapering to a smaller diameter.

Wings diffused brown, almost hyaline in some areas, no spots.

Hind femora black with red fascia posteriorly.

TYPE-LOCALITY. Cerro Tancitaro, Michoacán, Mexico.

TYPE MATERIAL. In the Chicago Museum of Natural History.

Machimus brevis Martin, new species.
(Figure 16.)

The hind femora of *Machimus brevis* Martin are red except for narrow black fascia anteriorly.

Male. Length 19 mm. Head black; face white tomentose, indistinctly brownish below antennae, front brown, narrowly yellowish laterally, vertex and occiput brownish yellow tomentose, narrowly gray along orbitals; mystax whitish yellow, gibbal bristles black, vestiture of antennae black and white, frontal and ocellar bristles black, occipital

bristles black with a few yellowish, pile whitish.

Thorax black, anterior and posterior calli red; mixed white, gray, and coppery brown tomentose, median stripe dark brown, broad, tapering on posterior declivity, from a posterior view divided anteriorly by a yellowish line, coppery red lines on each side of stripe, dark brown lateral spots change to coppery yellow at some views, transverse suture and posterior calli gray tomentose, laterally coppery yellow; vestiture black, dorsocentrals to transverse suture; scutellum dark brown, laterally narrowly gray, posterior margin coppery yellow, disc with black and white pile, two strong black bristles on posterior margin; pleura coppery brown tomentose, grayish brown posteriorly.

Abdomen black; from a lateral view ventral margins of tergites 2-4 gray and coppery brown, laterodorsally dark brown, tergite 2 gray anteriorly; incisures laterally whitish, tergites 3-5 narrowly gray anteriorly, dorsally tergites reddish brown pollinose, incisures brownish gray; vestiture dorsally black, along ventral margins pale; proctigeral hinge with two thornlike processes closer to the middle of the hinge than to the sides; epandria red, shining, slightly obliquely truncate apically.

Wings hyaline with brown spots, clear along veins except narrowly brown on apical margin.

Hind femora red with narrow black fascia anteriorly.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, 10 miles west of El Salto, Durango, Mexico, 9000 feet elevation, 30 June 1964, J. F. McAlpine (CNM). Allotype: female, Buenos Aires, 10 miles west of La Ciudad, Durango, Mexico, 9000 feet elevation, 11 June 1964, J. F. McAlpine (CNM). Paratypes: Mexico: 3 males, 4 females, same locality as holotype, 10 June - 10 July 1964, J. F. McAlpine, W. R. N. Mason; 1 male, 1 female, Buenos Aires, Durango, 11 June 1964, H. F. Howden, 1 July 1964, J. F. McAlpine; 1 male, 2 females, 3 mi. W. El Salto, 4-19 June 1964, J. F. McAlpine.

Machimus niveibarbus (Bellardi).
(Figures 9, 25, 33.)

Asilus niveibarbus Bellardi, 1861, Saggio di Ditterologia Messicana, Parte II, pt. 2, pp. 153-154. Type-locality: Cordova, Vera Cruz, Mexico, di Sassure. Syntype, male: Instituto e Museo di Zoologia dell'Universita di Torino.
Machimus niveibarbus; Martin and Papavero, 1970, Catalogue of the Diptera of the Americas South of the United States. Museu de Zoologia, Universidade de São Paulo, fasc. 35b, Family Asilidae, p. 86.

REDESCRIPTION. *Male*. Length 13 mm. Head black; face, front, occiput, yellow to yellowish white; mystax white, gibbal bristles white, a few black above; a male from México, D. F. has gibbal bristles similar to the syntype;

specimens from Popocateptl have more black bristles on gibba.

Thorax red, median and lateral stripes coalesce forming a large black spot; yellowish brown tomentose, median and lateral spots dark brown, extending to scutellum; pleura yellowish white.

Abdomen red, a row of black spots dorsomedially; mottled reddish and yellowish brown tomentose; at hinge of proctiger a flat, shelflike projection with a pair of mesal spines, aedeagus trifid, tubes long, sternite 8 posteriorly triangular.

DISTRIBUTION. Mexico: Vera Cruz (Type-locality); Popocateptl, México State, 10,000 ft., 31 March 1959, H. E. Evans (COR); 20 mi. SW. México, D. F., 8550 ft., 6 June 1956, H. A. Scullen (CHM).

Carrera and D'Andretta (1950) misidentified as *Machimus niveibarbus* a specimen of *Machimus* species from Tancitaro, Michoacán, Mexico.

Machimus mcalpinei Martin, new species.
(Figure 10.)

The ground color of the tergites of *Machimus mcalpinei* Martin is black, ventral margins red, incisures red laterally; from a lateral view tergites pale reddish brown pollinose on ventral margins, expanding along the incisures, irregularly reddish brown dorsolaterally; on tergites vestiture mostly white.

Male. Length 14 mm. Head black, gibba strong; face yellowish white tomentose with light brownish tinge at some angles, front mostly pale brown tomentose extending behind ocellar tubercle, occiput gray to white tomentose, more densely along the orbitals; vestiture on oral margin white, facial bristles black, antennal segment 1 with black and white bristles, longer ventrally, segment 2 and front with black bristles, upper occipitals black, white laterally; antennal segments 1 and 2 about equal in length, segment 3 narrow, slightly longer than segments 1 + 2, style about 1/2 as long as segment 3.

Thorax black, anterior and posterior humeri red; dorsally yellowish brown tomentose, grayish laterally and on posterior declivity; median stripe dark brown, tapering to scutellum, lateral stripes indistinct; vestiture black, not strong but long; scutellum black, narrowly red along anterior margin, disc gray tomentose anteriorly and laterally, brown tomentose posteriorly, sparse short white hair on disc, close-set white hairs and two strong black bristles on posterior margin; pleura red, mesepimeron black, also black just above middle coxa, mostly gray pollinose, vestiture white.

Abdomen black, red along lateral margins and incisures; from above tergite 1 grayish brown, tergites 2-6 dark reddish brown with broad grayish brown incisures, gray along lateral margins, from a lateral view brownish black margins on each tergite; short sparse recumbent white hairs, tergites 2-4

lateroposteriorly with weak short pale bristles of varying lengths; genitalia of male red, pollinose apically, vestiture white, dististylus with a tuft of hair on posterior margin.

Wings infuscated, a pale spot in cell 4.

Legs red, black fascia anteroventrally, vestiture of femora recumbent, short close-set hairs, sparse long bristles.

Female. Similar to male; ovipositor about as long as segments 7 and 8 together, black, sternite 8 red.

TYPE MATERIAL. Holotype: male, 3 miles east of El Salto, Durango, Mexico, 8200 feet elevation, 4 July 1964, J. F. McAlpine (CNM); Allotype: female, 10 miles west El Salto, Durango, Mexico, 10 June 1964, J. F. McAlpine. Paratypes: Mexico: Durango: 3 males, 3 mi. W. El Salto, 19 June 1964, J. F. McAlpine; 8 males, 7 females, 10 mi. W. El Salto, 5-30 June 1964, J. F. McAlpine; 3 females, 5 mi. W. Durango, 29 June - 14 July 1964, J. F. McAlpine; 3 males, 6 mi. S. Durango, 5 July 1964, J. F. McAlpine; 3 males, 23 mi. W. Durango, 6000-7000 ft., 15 July 1964, McAlpine, Mason; 1 female, 25 mi. W. Durango, 7500 ft., 29 June 1964, W. S. N. Mason; 4 males, 4 females, Buenos Aires, 10 mi. W. La Ciudad, 8000 ft., 11-16 June 1964, J. F. McAlpine; 1 female, Buenos Aires, 37 mi. W. El Salto, 1 July 1964, H. F. Howden; 1 female, 25 mi. W. Durango, Highway 40, 13 August 1962, Dorothy W. Martin. Sinaloa: 1 female, Santa Lucia, 4000 ft., 25 June 1964, J. F. McAlpine; 1 male, Portrerillos, 15 mi. W. El Salto, 5000 ft., 8 July 1964, J. F. McAlpine.

Machimus oriens Martin, new species.
(Figure 22.)

All specimens of *Machimus oriens* Martin have femora which are black except for narrow red fascia posteriorly.

Male. Length 13 mm. Head black; face yellow tomentose changing to darker brown, front streaked light brown and dark brown, occiput brownish gray tomentose; mystax white, gibbal bristles black, vestiture of antennal segment 1 black and white, frontal bristles black, occipital bristles black above, mostly white laterally; style over half as long as antennal segment 3.

Thorax black, calli narrowly red; orange-brown changing to darker brown tomentose, median stripe broad, blackish brown, appearing continuous to scutellum, but slightly disassociated at some angles, lateral stripes brown, broadly separated from median stripe; dorsocentrals extending 3-4 bristles anteriad of transverse suture; scutellum same color as thorax, changing from orange-yellow to brown, sparse pile on disc, a row of short pale bristles and strong black bristles on posterior margin; pleura brown tomentose with some gray intermixed.

Abdomen black; from a dorsal view tergites dark yellowish brown pollinose, from a lateral view grayish to orange-brown along ventral margins, dorsally reddish brown spots; vestiture pale; red epandria long, narrow, straight, rounded apically, brown pollinose, more densely apically, dististylus obliquely truncate, aedeagal median and lateral tubes taper to a point, the former subequal to the latter.

Wings thinly brown, posterior 4 with a brown spot.

Hind femora black except a more or less triangular red fascia posteriorly.

TYPE MATERIAL. Holotype: male, State of México, 10,200 feet elevation, Highway 190, kilometer post 49, 9 July 1959, Chas. H. Martin (CAS). Allotype: female, same data as holotype. Paratype: male, same data as holotype.

Machimus painteri Martin, new species.
(Figure 20.)

Male. Length 15 mm. Head black; face and front brownish gray tomentose, occiput grayish tomentose; oral bristles white, gibbal bristles black, vestiture of antennal segment 1 black and white, above occipital bristles black, laterally white; antennal segment 1 gray pollinose, segment 2 reddish, subequal to segment 1, segment 3 narrow, blackish brown, nearly 3 times longer than style, basal segment of style about 1/3 as long as apical segment.

Thorax black, anterior and posterior humeri red; from a lateral view thorax anteriorly reddish brown, posteriorly and laterally grayish brown, from a dorsal view the reddish brown median stripe terminating on posterior declivity, blackish stripe below it, laterad to median stripe brownish gray, anterior humeri gray; vestiture black, sparse white pile on posterior declivity; scutellum dark brown medially, borders gray, on disc pale pile and black bristles, posterior margin with short white bristles, two long black bristles; pleura mostly gray tomentose, some reddish brown.

Abdomen black; dorsally grayish brown with large blackish brown spots, from an oblique anterior view tergites blackish with brownish yellow incisures, in lateral view tergites yellowish brown, near ventral margins horizontal narrow blackish marks, vestiture whitish except dorsally black; dististylus expanded and rounded apically, the median and lateral aedeagal tubes abruptly reduce in diameter a short distance from the apex, red epandria long, narrow, curved ventrad at apex.

Wings hyaline basally, apically thinly brown, a spot in posterior cell 4.

Hind femora red dorsoposteriorly, black fascia not encroaching on dorsum, the black on ventral side slightly encroaching on posterior side, broad red band apically; hind tibiae blackish red anteriorly, pale red posterodorsally, each with a red band basally.

TYPE MATERIAL. Holotype: male, Cuernavaca, Morelos, Mexico, 9 July 1961, R. and K. Dreisbach (CAS). Paratypes: Mexico: 6 males, 4 females, same data as holotype; 1 female, Cuernavaca, 7000 ft., 29 July 1961, R. and K. Dreisbach; 2 males, 27-30 May 1959, H. E. Evans; 2 females, 21 June 1959, H. E. Evans; 1 male, Puebla, 5 mi. SW. Chapulcao, 5800 ft., 14 July 1970, E. M. Fisher. Hidalgo: 1 male, Zimapan, 5800 ft., 11-14 June 1951, H. E. Evans; 1 male, Ixmiquillpan, 5800 ft., 13 August 1963, R. H. and E. M. Painter. Oaxaca: 1 male, 1 female, Nochistlan, 6600 ft., 10 September 1963, R. H. and E. M. Painter; 1 male, Oaxaca, 5500 ft., at light, H. E. Evans. Chiapas: San Jacinto, Highway 190, kilometer post 783, 21 June 1959, C. H. Martin. Michoacán, 1 male, 16 mi. E. Morelia, 7700 ft., 29 May 1956, H. A. Scullen; 1 male, Tancitaro, 6200 ft., 28 June 1941, H. Hoogstraal (CMNH). Durango: 1 male, Highway 40, 20 August 1950, C. H. Martin. Zacatecas: 1 female, 19 mi. N. Tropic of Cancer, Highway 45, kilometer post 783, 16 August 1962, C. H. Martin; 1 male, 19 mi. S. Aguascalientes, Highway 45, 25 August 1960, C. H. Martin. Guerrero: 1 male, 1 female, 32 mi. W. Iguala, 5200 ft., 10 July 1970, E. M. Fisher.

REMARKS. *Machimus painteri* is a variable species, ranging from grayish to brownish yellow. The face ranges from white to gray to yellow to orange-yellow. From an obliquely anteriad view scutellum is totally grayish white to brownish yellow. Tergites range through various shades of brown, the incisures and ventral margins range from grayish to yellowish to brownish. The black fascia of hind femora encroach on the red dorsum on about one-third of the specimens.

Two specimens from Quiroga, Michoacán have bright yellow to orange-yellow faces, at some views tergites 2 and 3 appear grayish, otherwise orange-brown. The male genitalia of the two specimens are the same as that of the holotype of *M. painteri*.

Machimus truncatus Martin, new species.
(Figure 18.)

The mystax and gibbal bristles of *Machimus truncatus* Martin are mostly white with a few black bristles. In other North and Central American species the gibbal bristles are mostly black.

Male. Length 15 mm. Head black; face yellowish white tomentose, front grayish white, occiput gray tomentose; mystax with white bristles medially, three long slender black bristles on each side of oral margin, gibbal bristles white except above and laterally a few black; front and antennal segment 1 with white and black vestiture, dorsal occipital bristles black, lateral bristles white; antennal segment 3 ovoid.

Thorax black dorsally, red across lateral margins, pleura red except black above middle coxa and before wing base; dorsally thorax of various shades of brown tomentum, the broad median stripe terminating on posterior declivity above a darker blackish red stripe, geminate, a lateral spot before transverse suture, posteriorly a paler lateral spot, laterally grayish white, on posterior declivity two short longitudinal grayish white stripes, anteriorly dorsolaterally coppery brown on each side of midstripe; vestiture black; scutellum thinly to densely gray tomentose, a pair of long black bristles posteriorly; pleura mostly gray tomentose, vestiture yellow.

Abdomen black dorsally, ventral margins of tergites narrowly red anteriorly, interrupted posteriorly by black; sternites mostly various shades of red, incisures red; looking obliquely anteriad the tergites anteriorly broadly black, thinly brownish pollinose, posteriorly a grayish cross-stripe interrupted medially by blackish brown pollen, from dorsal view tergites thinly reddish black-brown pollinose, tergite 2 with a narrow grayish white cross-stripe near anterior margin, vestiture whitish on grayish areas, black on dark areas, from lateral view a rather broad grayish pollinose stripe along the ventral margins of tergites, dorsolaterally reddish brown pollinose; dististylus truncate, densely bristled medially on posterior margin; epandrium red, long, narrow, pollinose on apex.

Wings brownish, posterior cell 4 with a spot.

Hind femora red dorsoposteriorly, black dorsoanteriorly and ventrally.

Female. Unknown.

TYPE MATERIAL. Holotype: male, Cuernavaca, Mexico, 14 May 1959, 550 feet elevation, H. E. Evans (COR).

SUBGROUP 5

Machimus guttatus Martin, new species.
(Figures 7, 19.)

Machimus guttatus Martin has a close resemblance to *M. gertschi* (Bromley). The long black pile on the thorax, the hinge of the proctiger with a broad shelflike projection with a median emargination, abdominal bristles with small brown spots around bases are characters of *M. guttatus* but not of *M. gertschi*.

Male. Length 12 mm. Head black; face grayish yellow laterally, brown on upper gibba extending to antennae, front, vertex grayish brown to brown, occiput gray along orbitals, disc dark brown; mystax with numerous yellow bristles, long black gibbal bristles, occipital bristles black; antennal segments 1 and 3 black, segment 2 reddish, dark brown style subequal to length of segment 3.

Thorax black; humeri red; from above median stripe dark brown, broad, extending on scutellum, lateral spots lighter

brown, indistinct, anteriorly yellow pollinose along median stripe, anterior humeri pale brown pollinose, laterally thorax reddish brown tomentose; anteriorly short recumbent and semi-erect short black bristles, posteriad long erect black pile, dorsocentrals extending anteriorly to transverse suture; scutellum brown to yellowish brown on disc, short erect black bristles, laterally white pollinose, four black bristles on posterior margin, weak white bristles laterally; pleura black anteriorly, red posteriorly, mostly brown pollinose.

Abdomen red; from a lateral view tergites mottled white, reddish brown, and yellowish white tomentose, bristles with small brown spots around bases, from above tergites yellowish laterally, ovoid to trapezoidal reddish brown spots, sternites yellowish to reddish brown tomentose; epandrium red, brown pollinose, proctiger with a shallow V extending from hinge.

Wings nearly hyaline, spots in posterior cells, apically the brown much fainter along the wing veins.

Hind femora red, black fascia anteroventrally, rather sparse yellow hair ventrally.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, 6 miles southeast San Cristobal, Chiapas, Mexico, 28 March 1953, Bechtel and Schlinger (CAS). Paratypes: Mexico: 2 males, San Cristobal Las Casas, 7500 ft., Chiapas, 28 April 1959, H. E. Evans.

Machimus submaculus Martin, new species.
(Figures 4, 27, 36.)

Machimus submaculus Martin differs from other species of *Machimus* in the red hind femora with narrow black ventral fascia not visible from a lateral view.

Male. Length 14 mm. Face black; gibba reddish brown tomentose, face whitish laterally and above gibba light brownish tomentose, front and vertex gray and brown tomentose, occiput with grayish brown disc, gray along orbitals; oral margin and gibba with both black and white bristles, antennal segment 1 with long black bristles, dorsally both white and black hairs, vestiture of segment 3 similar but shorter, frontal and ocellar bristles black with a few yellow hairs, occipital bristles above black, pile whitish; antennae black, brown tomentose, segment 1 about twice as long as segment 2, segment 3 and style almost equal to length of segments 1 + 2.

Thorax black; reddish brown tomentose with some grayish areas, median stripe brown, uniform in width to scutellum from some views, lateral spots coalesce with median stripe from a lateral view, from above lateral stripes become whitish beside the median stripe; vestiture black, a few pale hairs anterolaterally; scutellum black, at some angles reddish brown and gray tomentose, the other half black

reddish brown, disc with sparse pale hair, on posterior margin two strong and two weak bristles; pleura black, reddish brown tomentose, vestiture pale bristles, white pile; metanotum gray tomentose, calli with patches of long yellowish hairs.

Abdomen black; laterally margin brownish gray tomentose, laterodorsally mottled browns, whites, and grays, from above grayish tomentose, tergites 2-5 medially with brownish elongate spots with recumbent black bristles, vestiture both white and yellow, yellow bristles on incisures, incisures yellowish brown tomentose; genitalia of male red, proctiger V-shaped, at hinge medially two small thornlike processes close together, broad short lateral processes opposite median processes, dististylus only slightly expanded distally, epandrium obliquely truncate.

Wings brown spotted, apex brown, clear along veins.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, west slope Popocatepetl, 10,000 feet elevation, Mexico, 15 May 1959, H. E. Evans (COR). Allotype: female, 4 miles northwest Cuernavaca, 7500 feet elevation, Morelia, Mexico, 28 June 1959, H. E. and M. A. Evans (COR). Paratypes: Mexico: 5 males, same locality as holotype, 31 March - 19 May 1959, H. E. Evans; 2 females, 8 mi. N. Cuernavaca, 8800 ft., Morelia, 23 May 1959, H. E. Evans; 2 males, 10 mi. N. Cuernavaca, 9000 ft., 4 April 1959, H. E. Evans; 1 female, 47 mi. NW. Toluca, 8300 ft., 20 August 1962, R. H. and E. M. Painter; 1 female, 31 mi. W. Morelia, 7600 ft., Michoacán, 1956, H. A. Scullen.

SUBGROUP UNKNOWN

Machimus alterus (Williston).

Asilus (Tolmerus) alterus Williston, 1901, Biologia Centrali-Americana, Diptera, Suppl., p. 330. Type-locality: Omilteme, Guerrero, Mexico, 8000 ft.

Machimus alterus; Martin and Papavero, 1970, Catalogue of the Diptera of the Americas South of the United States. Museu de Zoologia, Universidade de São Paulo, fasc. 35b, Family Asilidae, p. 85.

Machimus alterus (Williston) has the ground color of the body more extensively red than any other North American species of *Machimus*. Sternite 8 has a triangular lobe on the posterior margin. The epandrium is broad, densely brown pollinose.

Syntypes of *Machimus alterus* are in the British Museum (Natural History). Among the syntypes of *Machimus tenebrosus* (Williston) at American Museum of Natural History is one specimen which should be labeled *M. alterus*.

TOLMERUS GROUP

In the key to the species of *Machimus* I am including species of the Tolmerus Group, mostly from the western United States and Mexico. Many species in the Tolmerus Group east of the Rocky Mountains have the hind femora totally black. These are not included in the key to *Machimus*.

SUBGROUP 2

Machimus callidus (Williston), new combination.
(Figures 2, 6, 29, 40.)

Asilus callidus Williston, 1893, Kansas Univ. Quart., vol. 2, p. 75.
Asilus callidus; Hine, 1909, Ann. Ent. Soc. Amer., vol. 2, p. 157.
Tolmerus callidus; Martin and Wilcox, 1965, U. S. Dept. Agriculture, Handbook no. 276, p. 401.

One of the most stable characters of *M. callidus* are the anterior broad black tergal bands, posteriorly narrow densely white pollinose bands which expand lateroanteriorly. The specimen should be viewed at an oblique angle looking anteriad. Also, the proctiger has a pyramidal, sometimes conelike projection apicoventrally. I have seen one specimen in several hundred without this projection. Laterally at the hinge of the proctiger are a pair of more or less cylindrical processes which are variable in length.

The margin of sternite 8 is straight in many specimens, but there are specimens with a distinct small triangular projection on the posterior margin.

The hind femora are usually black with a preapical red band. Occasionally the band is not distinct. Sometimes the red extends on the posterior side halfway to the base. The hind tibiae are some shade of red.

The dorsocentral bristles are highly variable in number.

The shape of antennal segment 3 is variable in width and length, so that it cannot be used to identify *Machimus callidus*.

DISTRIBUTION. United States: California as far south as Mt. San Jacinto; Oregon; Washington; Montana; Idaho; Wyoming; Colorado. Canada: British Columbia; Alberta.

Machimus sadyates (Walker), new combination.
(Figure 3.)

Asilus sadyates Walker, 1849, List...dipterous insects...of the British Museum, vol. 2, p. 453.
Asilus tibialis Macquart, 1834, Hist. nat. des Insectes, vol. 1, p. 313, preocc. Fabricius, 1793.
Asilus avidus Wulp, 1869, Tijschr. v. Ent., vol. 12, p. 82. New Synonym.
Machimus avidus; Martin and Wilcox, 1965, U. S. Dept. Agriculture, Handbook no. 276, p. 396. Recombination. Misidentification.

Machimus avidus (Wulp), a synonym of *M. sadyates* (Walker), was described from Wisconsin, but it has been mistaken many times for the western *Machimus adustus* Martin, a new species described herein.

I have four specimens of *Asilus sadyates* Walker compared with Walker's syntype in the British Museum (Natural History). I examined Wulp's *Asilus avidus* at the Ryksmuseum van Natuurlyke Histories, Leiden, Netherlands through the courtesy of Dr. A. Diakonoff. Examination of the male genitalia shows *Asilus avidus* Wulp to be a synonym of *Machimus sadyates* (Walker).

Machimus sadyates has a straight margin on sternite 8 of the male, while *M. adustus* Martin has a triangular lobe. Also, the proctiger of *M. sadyates* is flattened apically into a large triangular projection from the ventral surface; at the hinge is a pair of large nearly round lobes coalesced basally (fig. 3).

DISTRIBUTION. *Machimus sadyates* ranges from Wisconsin to Massachusetts and southward into North Carolina.

SUBGROUP 3

Machimus cancerae Martin, new species.

The wings of *Machimus cancerae* Martin are stained reddish brown, similar to those of *M. bromleyanus* (Carrera and D'Andretta). The gibba is weaker and the aedeagal sheath and lateral tubes more deeply separated than in most *Machimus*. Three dorsocentral bristles are anterior to the transverse suture. The species is provisionally assigned to *Machimus*.

Male. Length 12 mm. Head black; face, front, and occiput grayish white tomentose, strong black bristles medially on gibba, weaker white bristles laterally and around oral margin; antennae black, segments 1, 2, and style subequal to the slender antennal segment 3.

Thorax black except red around wing base; gray to yellowish tomentose, median stripe dark brown, geminate, from a lateral view the lateral spots separated from median stripe, dark brown, from a dorsal view pale brown, thorax

gray to grayish brown or yellowish anterolaterally and laterally, short recumbent hairs pale, bristles black, scutellum gray to brownish gray tomentose, two long black bristles on posterior margin; pleura brownish gray tomentose, vestiture white.

Abdomen black; tergites yellowish brown tomentose, tergites 5-8 dark brown; lateroposterior bristles stronger than the recumbent shorter weak bristles covering the tergites, tergite 2 lateroposteriorly with two yellow and black bristles on the ventral margin, tergite 4 with two long bristles, one yellow and one black, several weaker shorter bristles on posterior margin; sternite 8 straight on posterior margin; aedeagus with sheath and lateral tubes unusually long; lateral processes at the hinge of the proctiger long and cylindrical.

TYPE MATERIAL. Holotype: male; allotype: female; both on same pin, 1/2 mile south of Tropic of Cancer, Highway 45, kilometer post 758, Zacatecas, Mexico, 16 August 1962, Chas. H. Martin (CAS). Paratypes: Mexico: 5 males, 5 females, same data as type specimens; 1 female, Amecameca, Morelos, 8000 ft., 17 August 1951, R. and K. Dreisbach.

Machimus grantae Martin, new species.
(Figures 17, 71.)

The posterior margin of sternite 8 of *Machimus grantae* Martin is straight; wings infuscated without spots.

Male. Length 16 mm. Head black; face and occiput gray tomentose, front mostly gray with some brown tomentum, bare below antennae; vestiture black except for a few white hairs on oral margin and occiput with white lateral bristles and pile; antennae black, segments 1 + 2 and style subequal to length of segment 3.

Thorax black, humeri dark reddish; mixed gray and brown tomentose, median stripe subshining brown, tapering to a narrow point on posterior declivity, subshining lateral spots divided; vestiture black except pile on anterior and on posterior declivity; scutellum subshining brown, sparse white pile on disc, two strong and two weak bristles on posterior margin; pleura black, gray tomentose, vestiture yellowish to white.

Abdomen black, incisures and narrowly along lateral margins red; gray tomentose, reddish brown dorsally; vestiture dorsally black, laterally white, short yellowish bristles laterad above incisures; male genitalia red, epandria about as wide as long, broadly rounded on apex, proctiger short, at hinge two lateral processes near lateral margins; dististylus truncate, tapering gradually from the narrow base to the apex.

Wings uniformly infuscated.

Hind femora black with a red apical band, tibiae red, narrowly darkened apically.

Female. Unknown.

TYPE MATERIAL. Holotype: male, Summit east of Prairie, Oregon, 9 August 1939, Schuh and Gray (CAS). Paratypes: 2 males, same data as holotype, 3 and 9 August 1935, Schuh and Gray.

SUBGROUP 4

Machimus cerasinus Martin, new species.
(Figures 31, 32.)

The posterior margin of sternite 8 of male of *Machimus cerasinus* Martin is straight; the black hind femoral fascia reaches the apex.

Male. Length 19 mm. Head black; face white tomentose, front grayish white; occiput gray tomentose; mystax bristles yellow, gibbal bristles black, frontal bristles mostly black, occipital bristles black dorsally, yellow laterally.

Thorax black, humeri red; dorsally yellowish brown tomentose, the humeri gray tomentose, gray of anterior humeri extending to the median stripe, a narrow yellow stripe from humerus to humerus, median and lateral stripes yellowish brown, posterior declivity yellowish, with five narrow longitudinal stripes; vestiture black, white pile laterally; scutellum brownish yellow tomentose, short erect black bristles on disc, a pair of long black bristles on posterior margin; pleura brownish yellow, vestiture yellow except one black bristle.

Abdomen black; dorsally yellow to reddish brown pollinose, with dark elongate spots medially, dorsolaterally vestiture black, white along ventral margins, from a lateral view same color as above, becoming darker brown with the angle of view; epandrium broad, red pollinose; aedeagal sheath longer than lateral tubes, dististylus sickle-shaped with a fringe of hair on posterior margin.

Wings grayish brown, a spot on posterior cell 4.

Hind femora black, ventrally, anteriorly, and partially dorsally the black extends to the apex of each, red posteriorly and partially dorsally, vestiture white except short recumbent black bristles ventrally.

Female. Unknown.

TYPE MATERIAL. Holotype: male, 20 miles north Tehuacan, Puebla, Mexico, 6000 feet elevation, 10 September 1959, R. H. and E. M. Painter (CAS).

SUBGROUP 5

Machimus humilis (Bellardi).
(Figures 37, 77.)

Asilus humilis Bellardi, 1861, Saggio di Ditterologia Messicana, Parte II, pt. 2, p. 151. Type-locality: Mexico (Truqui). Syntype, female: Instituto e Museo di Zoologia dell'Universita di Torino, Italy.
Machimus humilis; Martin and Papavero, 1970, A Catalogue of the Diptera of the Americas South of the United States. Museu de Zoologia, Universidade de São Paulo, fasc. 35b, Family Asilidae, p. 86. Recombination.

REDESCRIPTION. Length 8-10 mm. Black; grayish yellow tomentose, yellow the dominant color; antennal segment 3 linear, 3.5 times longer than the short style; mystax yellow below, black above, occipital bristles yellow with an occasional black bristle, thorax with long widely spaced dorsocentral bristles extending 3-5 bristles beyond the transverse suture; scutellum with erect yellow pile on disc, posterior margin with two long yellow bristles; abdomen with short pale yellowish vestiture except dorsomedially recumbent short black bristles on the indistinct brown spots, posterior margin of tergite 8 straight, male genitalia red, epandria narrow, aedeagus trifid, hinge of proctiger with two short spinelike processes laterally.

Female. Similar to male; ovipositor black, sternite 8 reddish yellow; legs polished black.

DISTRIBUTION. Mexican states of Puebla; México; Distrito Federal; Morelia; Guanajuato; Michoacán; Jalisco; southern Chihuahua; from 5000 to 8500 ft.; collected from 9 August to 20 September.

POLACANTHA Martin, new genus

Type-species. *Asilus compositus* Hine, 1918.

Asilus compositus Hine and *A. gracilis* Wiedemann are assigned to the new genus *Polacantha* Martin (Poly: many; acantha: thorns; feminine, referring to the patch of strong bristles inside the epandrium)(Asilini: Asilidae) along with seven new species from Mexico and the United States. Also, the new subgenus *Echinitropis* Martin with a new species and a described species are assigned to *Polacantha*.

Authors separate the two named species of *Polacantha (Polacantha)* from other North American species assigned to *Asilus* Linnaeus by the style being nearly twice as long as segment 3 including the short to long microsegment, by the slender body, and by the weak gibba.

GENERIC CHARACTERS. Slender species except *Polacantha (Polacantha) grossa* Martin; length 11-21 mm.; gibba weak with a small patch of strong facial bristles and usually weak oral bristles; antennal segment 3 is either subequal to, longer, or shorter than the style without its microsegment

which is 1/10 to 1/3 as long as segment 3, style usually dilated apically, strong occipital bristles, dorsocentral bristles on posterior declivity of mesothorax, short erect bristles on mesothorax; median thoracic stripe usually geminate, a narrow single median stripe on posterior declivity of mesothorax; scutellum sparsely pilose, two long bristles and short hair on posterior margin; anterior humeri with hairs or bristles; tergites laterally on posterior corners with strong bristles, dorsomedially short recumbent bristles or more or less erect pile, in several species a pair of long strong bristles anterolaterally on sternites 2 and 3. The fascia on femora may be both present and absent in the same species.

The male genitalia are useful in identifying *Polacantha*. The hypandria of the species from Mexico and the western United States are shallowly to deeply emarginate. The hypandrium of *Polacantha gracilis* in the eastern United States is scarcely or not at all emarginate. The epandrium has a patch of strong bristles on the inside surface. The aedeagal sheath is formed by two coalesced tubes usually tapering to a hooklike apex except in one species and in occasional specimens of others. The shape of the aedeagus is specific. In *Polacantha*, what are the lateral aedeagal tubes of other Asilini are attached ventrally to the aedeagal sheath, their length varying from 1/15 of, to subequal to that of the aedeagal sheath. The ventral tubes, except *P. arcuata* Martin and *P. tridens* Martin, are so short that they are likely mechanically non-functional in copulation.

The habitus of *Polacantha* is similar to that of the Oriental *Clephydroneura* Becker. The aedeagi of *Clephydroneura* are three-tubed, while those of *Polacantha* are single-tubed. The epandria on the inside surface of *Clephydroneura* are with or without long slender bristles, or with hairs; in *Polacantha* the bristles are shorter, stronger, and always present.

While the southern two-thirds of California is an important area for the isolation and speciation of the Occidentalis Group in *Machimus*, yet *Polacantha compositus* (Hine), occupying much the same area below 4500 feet, is restricted to mostly grass or trees rather than appearing in the more numerous habitats of *Machimus*. There is no speciation except for a possible subspecies in Baja California. *Polacantha compositus* ranges from the tip of Baja California to eastern Oregon and southeastward into Texas and southward into central Mexico. *Polacantha gracilis* is endemic to Georgia and Florida. Two new species are endemic to Texas, one to Arizona, and four to Mexico.

Specimens of *Polacantha* are generally swept from grass. Occasionally some species inhabit trees. Many come to ultraviolet light. The eyes are green in freshly collected specimens.

Key to the North American Species of *POLACANTHA*

In the following key the male characters are frequently the major characters available to separate species. In some species the sexes are somewhat dimorphic.

The male genitalia are prepared for observation by removing the epandrium, basistylus, and dististylus from one side. Sometimes this will expose the short ventral tubes of the aedeagus, but in other specimens the tubes may be found as far back as sternite 6.

1. Epandrium without a process projecting from its inner surface *Polacantha (Polacantha)*..... 3
   Epandrium with a process projecting from its inner surface *Polacantha (Echinitropis)*..... 2

2(1). Black species; abdomen subshining dark brown pollinose; numerous short recumbent black bristles on dorsum of tergites (California)..... ..... *pegma* Martin, new species
   Yellow species; abdomen brownish yellow pollinose, narrow brownish spots medially on tergites; vestiture of tergites yellow (Guerrero)..... ..... *xanthocera* (Williston)

3(1). Mystax bristles white medially, black laterally and among facial bristles; face brown tomentose; antennae black (Hidalgo)..... *badia* Martin, new species
   Mystax bristles either white or yellow; one or more antennal segments yellow to dark brown, occasionally antennae totally black 4

4(3). Antennal segment 3 black, ovoid, apex a short tube, as long as segment 1; ventral tubes about 1/15 as long as aedeagus; face gray, front brown; length 13 mm. (Chiapas)..... ..... *brevis* Martin, new species
   Antennal segment 3 usually elongate, not ovoid 5

5(4). Abdomen with ground color black to dark red 7
   Abdomen with ground color red 6

6(5). Occipital bristles red; face usually yellowish; a more slender species; length 13-18 mm. (Florida; Georgia).. ..... *gracilis* (Wiedemann)
Medially occipital bristles black; face grayish; robust species; length 15-16 mm. (Texas)..... *grossa* Martin, new species

7(5). Thoracic ground color red with median and lateral black stripes 10
Thoracic ground color black dorsally, red laterally and posteriorly 8

8(7). Short erect black bristles covering dorsum of thorax; base of aedeagus abruptly constricts and bends at apices of long ventral tubes, forming a squared U; length 18 mm. (Texas)... ..... *sinuosa* Martin, new species
Short erect black bristles confined along, or sometimes on, median stripe 9

9(8). Large species; metanotal calli whitish yellow tomentose, yellow bristled; hind femora yellow; length 17-20 mm. (Chihuahua; Durango)..... ..... *petila* Martin, new species
Small species; metanotal calli gray tomentose, white bristled; hind femora yellow, broad black fascia; length 12 mm. (Durango; Hidalgo)..... ..... *tridens* Martin, new species

10(7). Antennal segments yellow, style brown; ventral tubes about 2/3 as long as aedeagus; no short black bristles around transverse suture; length 17-18 mm. (Arizona)..... ..... *arcuata* Martin, new species
Antennal segment 3 and style brown; ventral tubes 1/8 to 1/12 as long as aedeagus; short black bristles around transverse suture; length 12-18 mm. (California; Oregon; Arizona; New Mexico; Mexico)..... ..... *compositus* (Hine)

Polacantha (Polacantha) Martin, new subgenus

Polacantha (Polacantha) arcuata Martin, new species.

The aedeagal ventral tubes of *Polacantha arcuata* Martin are about 2/3 as long as the aedeagal sheath.

Male. Length 18 mm. Face red, blackish medially, occiput black; head white tomentose; vertex yellowish; vestiture pale except the black bristles on antennal segments and ocellar tubercle, long frontal bristles; antennal segments 1 and 2 yellow, segment 3 and microsegment red, style blackish, segment 3 longer than segment 1 or style.

Thorax red, lateral and medial stripes black; grayish brown tomentose, grayer laterally and posteriorly, median stripe brown; vestiture of mesothorax black except pale pile on anterior declivity; scutellum reddish pale yellow, brown tomentose, long pale pile on disc and posterior margin, two black posterior bristles; pleura gray tomentose, vestiture pale.

Abdomen dark reddish, lighter red incisures; brown pollinose mixed with some gray, narrow gray bands on posterior margins of tergites; vestiture pale except dorsomedially short black bristles; epandrium red, narrowly black on dorsomesal margin, denticles on apicodorsal margin strong, aedeagus usually bends sharply ventrad near apex rather than forming the normal hook.

Wings hyaline, apex lightly infuscated.

Legs yellow, without fascia.

Female. Coloration and markings similar to male; ovipositor red.

TYPE MATERIAL. Holotype: male, Peña Blanca, 10 miles west Nogales, Santa Cruz County, Arizona, 10 July 1961, at ultraviolet light, Werner, Nutting (CAS). Allotype: female, Santa Rita Mountains, Madera Canyon, Arizona, 11 August 1961, Eric M. Fisher (EMF). Paratypes: Arizona: 1 male, same data as holotype (ARIZ); 1 male, Santa Rita Mts., Madera Canyon, 4700 ft., Pima Co., 3 August 1962, Chas. H. Martin; 2 males, Santa Rita Mts., Madera Canyon, 25 June 1949, J. Wilcox, same locality, 8 August 1962, Itol Wilcox (WIL); 1 male, Huachuca Mts., 18 July 1938, R. I. Sailer; 1 male, Huachuca Mts., 26 July 1936, J. N. Knull; copulating pair, Tumacacori Mts., Sycamore Canyon, Santa Cruz Co., 4000 ft., 28 July 1965, Hugh B. Leech; 1 male, 1 female, Baboquivari Mts., F. H. Snow.

Polacantha (Polacantha) badia Martin, new species.

The broad anterodorsal black fascia covering all femora almost from apex to base, the face dark brown medially, and yellowish brown laterally, and a white mystax with a few black bristles separate *Polacantha badia* Martin from the other species of *Polacantha.*

Male. Length 13 mm. Head black; face broadly medially dark brown, laterally yellowish brown tomentose, latero-ventrally gray tomentose; mystax mostly with sparse white bristles, black bristles laterally on oral margin and intermixed in facial bristles, other vestiture blackish, antennal segment 3 subequal to style, segment 1 subequal to segment 3.

Thorax black, posterior calli dark red; dark yellowish red brown tomentose, brassy yellow on anterior calli, geminate median stripe subshining black anteriorly, dark reddish brown posteriorly, laterally with more or less indistinct spots.

Abdomen subshining brown tomentose; diameter of aedeagal tube narrow, bending dorsad at 135° angle at 1/3 of length from base, apex hooked, pair of short ventral tubes near base with apices flared.

Wings brownish.

Legs light yellowish brown, anterodorsally black fascia extending almost to apex and to base.

Female. Unknown.

TYPE MATERIAL. Holotype: male, La Zorra, Hidalgo, Mexico, Highway 85, kilometer post 276, 2 July 1959, Chas. H. Martin (CAS).

Polacantha (Polacantha) brevis Martin, new species.

The small ovoid antennal segment 3 and the erect spines covering the apical half of the inner surface of the epandrium identify *Polacantha brevis* Martin.

Male. Length 13 mm. Head black; face grayish tomentose, front, vertex, and occiput yellowish brown tomentose; mystax bristles whitish, frontal bristles pale below, black above, antennal bristles black, occipital vestiture pale yellowish except for a strong black bristle above; antennal segment 1 reddish, segment 2 yellow, segment 3 and style dark reddish brown, segments 1 and 3 equal in length, style 3/5 longer than segment 3, segment 3 ovoid, about twice as long as wide.

Thorax red, three narrow black stripes; pronotum brownish yellow, mesonotum yellowish to orange-brown, median stripe brown, outlines not sharp, indistinct darker areas laterally; vestiture black; scutellum same color as mesonotum, sparse pale hair on disc, two black bristles on posterior margin; pleura red, yellowish tomentose; vestiture pale.

Abdomen dark red, incisures yellow, reddish brown tomentose; epandria red, narrowly black dorsally, about twice as long as wide, broadly rounded apically, ventral aedeagal tubes very short, aedeagal tube of small diameter.

Wings slightly infuscated, more densely apically.

Legs yellowish, indistinct reddish brown fascia on femora.

Female. Unknown.

TYPE MATERIAL. Holotype: male, Tuxtla Gutierrez, Chiapas, Mexico, 1000 feet elevation, 24 April 1959, H. E. Evans (COR).

Polacantha (Polacantha) compositus (Hine), new combination. (Figures 43, 45, 58.)

Asilus compositus Hine, 1918, Ohio Jour. Sci., vol. 18, p. 31. Type, male: Ohio State University Collections.

Hine designates a male specimen from San Diego, California, as holotype of *Asilus compositus* Hine, and three paratypes: one male, mountains near Claremont, California, and two males, Los Angeles County, California, collected by Coquillett. A male and a female paratype from Kerrville, Texas, are specimens of *P. sinuosa* Martin rather than specimens of *Asilus compositus* Hine as labeled.

At hand are approximately 200 specimens of *Polacantha compositus* (Hine) from California, eastern Oregon, Nevada, Utah, Arizona, New Mexico, and Texas. In Mexico the species ranges from Baja California, Chihuahua, to San Luis Potosi. Some of the variability of the specimens is associated with geography.

The face and mystax are usually white, but in some specimens they are various shades of yellow. Antennal segment 3 varies from subequal to, to half as long as the style, exclusive of the microsegment. The mesothorax varies from broadly black medially to red with black stripes. Thoracic tomentum is usually gray and brown, but in some it is almost totally gray, while in others the gray is replaced by yellow. The pleura are gray or whitish. The median brown thoracic stripe is either distinct or indistinct. The abdomen is subshining reddish dark brown dorsally and gray laterally. The incisures are gray to gray mixed with brown. The tergites of the males have dorsolaterally varying amounts of yellow or white hair either erect or semirecumbent, variable amounts of black recumbent bristles dorsomedially between the yellow or white vestiture. In the females the tergites are covered with recumbent black bristles with a few yellowish bristles anteromedially.

The apical half of the ventral margin of the epandrium slopes upward to form an angle with the more or less rounded truncate dorsoapical margin. In some specimens the apex is broadly rounded, or it is distinctly pointed, but usually the epandrium is more or less obliquely truncate. A tuft of white bristles on the apicodorsal point of the epandrium and a patch of white vestiture anterior to the black bristles on the inner surface either present or absent.

The number of denticles along the dorsomesal margin of the epandrium varies from none to seven or eight. Most specimens from the southern half of Baja California have only one denticle and the ventral epandrial margin is slightly emarginate near the apex, giving the apex a somewhat hooked shape. These specimens could represent subspecies.

The aedeagus of *Polacantha compositus* is nearly uniform in diameter and does not abruptly change from a large to a small diameter as in *P. sinuosa* Martin, but does form a

squared U as in *P. sinuosa*. This shape in *P. compositus* is subject to some variation.

Polacantha (Polacantha) gracilis (Wiedemann), new combination.

Asilus gracilis Wiedemann, 1828, Aussereuropäische zweiflügelige Insekten, vol. 1, p. 445. Type, male: Naturhistoriches Museum, Vienna. Type-locality: Savannah, Georgia.
Asilus auratus Johnson, 1895, Proc. Acad. Nat. Sci. Phil., vol. 47, p. 305. Type-locality: Florida.

REDESCRIPTION. *Male.* Length 13-18 mm. Face and vertex yellow, occiput yellowish gray tomentose; vestiture yellow or pale gray, short gibbal bristles above mystax, antennal bristles black, antennal segments 1 and 2 yellow, segment 3 and style dark reddish; style about 1 1/2 times longer than segment 3, segment 1 equal to length of segment 3, microsegment 1/10 the length of the style.

Abdomen red, subshining reddish brown pollinose, yellowish gray laterally and narrowly across anterior margins of tergites; yellow vestiture, patch of short black bristles medioposteriorly on tergites, epandrium variable in width, somewhat rounded apical truncation, aedeagal ventral tubes variable in length.

Wings pale brown.

Legs yellow.

Female. A female from Barnesville, Georgia has a gray face, dark brown median thoracic stripe, pleura gray, abdomen similar to male. A female from Palm Beach, Florida resembles the male described, but it has more numerous black bristles on the tergites.

Polacantha (Polacantha) grossa Martin, new species.

A robust, reddish species; tergites subshining yellowish brown, covered with yellow hair except a narrow patch of short black bristles posteromedially, longer black bristles medially on incisures, sternites with sparse yellow bristles, some stronger than others, help to identify *Polacantha grossa* Martin.

Male. Length 16 mm. Head black; face pale yellow tomentose, vertex darker yellow, occiput grayish yellow tomentose; vestiture yellowish except antennal and upper occipital bristles black; antennal segments 1 and 2 yellow, segment 3 reddish, style blackish, segment 3 subequal to the length of the style, microsegment about 1/6 the length of segment 3.

Thorax red with black stripes and spots; grayish tomentose, median stripe pale brownish, yellowish above anterior calli, vestiture mostly red, coxae and pronotum red, white to brownish white pollinose.

Abdomen deep red, pale yellowish brown pollinose, more thinly on tergites 5-8, vestiture mostly yellowish pile, longer laterally and on sternites, long strong yellow bristles on incisures, ventral aedeagal tubes about 1/10 as long as aedeagus.

Wings hyaline, infuscated apically and along posterior margin.

Legs yellow, darkened anteriorly on femora.

Female. Coloration similar to male, antennal segment 3 blackish; no long yellow hair on abdomen, dorsally short black recumbent bristles.

TYPE MATERIAL. Holotype: male, 5 miles north of Kerrville, Kerr County, Texas, 1 July 1964, at ultraviolet light, D. R. Smith and C. W. Baker (CAS). Paratypes: 3 males, same locality as holotype (CHM); 1 male, Kerrville, Texas, 20 June 1942, E. S. Ross (CAS); 1 female, Austin, Texas, 3 June 1929, J. O. Martin (CAS); 1 male, 7 June 1921, R. H. Painter (KSU); 1 male, Concan, Texas, 6 July 1936, J. D. Beamer (KU).

Polacantha (Polacantha) petila Martin, new species.

The narrow basal diameter of the aedeagal sheath, the ventral aedeagal tubes about 1/2 as long as the aedeagal sheath, the tergites brownish yellow, almost olive green, and the abundance of yellow vestiture and the scarcity of dark recumbent bristles help to identify *Polacantha petila* Martin.

Male. Length 17 mm. Face narrowly red laterally, broadly black medially, occiput black; face yellow tomentose, front, vertex, and occiput deep yellow tomentose; mystax bristles yellow, antennal segments 1 and 2 with sparse yellow bristles, occipital bristles pale; antennal segments dark yellow, style brown, segment 3 1.5 times longer than segment 1, 1.2 times longer than style, 6 times longer than the microsegment.

Thorax red; brownish yellow tomentose, median stripe blackish brown, lateral spots indistinct, brownish; pronotum red, yellowish tomentose, a yellowish tomentose area above anterior humeri; scutellum with black vestiture except yellow pile on disc, two dark bristles on posterior margin; pleura red, yellow tomentose, vestiture pale.

Abdomen blackish red, incisures lighter; tergites brownish yellow tomentose, almost olive green; vestiture yellowish, recumbent, no black vestiture on anterior five segments; epandrium red, dorsal margin narrowly black, strongly dentate; ventral aedeagal tubes about half as long as aedeagal sheath, the latter unusually short, without the usual apical hook.

Wings yellow, infuscated apically.

Legs reddish, pale brownish fascia on femora.

Female. The females collected near the localities of the males have tergites of the same color as the males, but

have sparse recumbent yellow bristles laterally, and black ones medially.

TYPE MATERIAL. Holotype: male, 24 miles west La Ciudad, Durango, Mexico, 8 July 1964, J. F. McAlpine (CNM). Paratypes: 2 males, same data as holotype, W. R. M. Mason.

Polacantha (Polacantha) sinuosa Martin, new species.

The thoracic background color of *P. sinuosa* Martin is black without stripes, but that of the less robust *P. compositus* is red with black stripes. The enlarged portion of the aedeagus of *P. sinuosa* curves at right angles over the apex of the long ventral tubes, abruptly constricting and forming a broad U ending in a hook.

Male. Length 18 mm. Ground color of face mostly dark red, occiput black; face and occiput white to grayish white tomentose, front grayish medially, light brown laterally; vestiture whitish except black antennals and occipitals, mystax on lower third of face, stout bristles medially; antennal segments 1 and 2 yellow, segment 3 reddish, microsegment and style dark reddish brown, segments 1 and 3 equal in length, subequal to style.

Black thoracic stripes coalesced forming a black spot, reddish anteriorly and posteriorly; pronotum gray, mesothorax yellowish brown, more grayish laterally and posteriorly, median stripe dark brown, lateral spots indistinct, brownish; short erect black bristles, pale white pile on posterior declivity; scutellum grayish brown, long sparse white pile on disc, and on posterior margin two long black bristles; pleura gray, vestiture pale.

Abdomen dark reddish with lighter incisures; brownish gray pollinose, tergite 2 gray anteriorly, incisures more gray than brown.

Wings hyaline, infuscated apices.

Legs yellowish red, indistinct fascia anteriorly on all femora, tibiae yellowish.

Female. Similar in coloration to male.

TYPE MATERIAL. Holotype: male, Chisos Mountains, Rim trail to Juniper Flats, Texas, 12 August 1960, Chas. H. Martin (CAS). Allotype: female, same data as holotype (CAS). Paratypes: Texas: 1 male, Kerrville, 20 June 1942, E. S. Ross (CAS); 1 male, Chisos Mts., Big Bend Park, 8 July 1946, E. C. Van Dyke (CAS); 1 male, Brownsville, 3 June 1932, J. O. Martin (CAS); 1 male, Big Bend, 23 June 1947, L. D. Beamer (KU); 10 males, 4 females, Chisos Mts., 7 July 1928, F. M. Gaige (MICH); 2 males, 2 females, Rim Trail to Juniper Flats, 12 August 1960, Chas. H. Martin (CHM); 1 male, 1 female, Chisos Mts., 26 June 1961, D. J. and J. N. Knull (OHIO). Mexico: 1 male, Pedricena, Durango, 4500 ft., 19 August 1947, Cazier (AMNH); 1 male, 11 mi. N. Tomaseño, Tamaulipas, 28 June 1970, E. M. and J. L. Fisher (EMF); 4 males, 12 mi. N. Linares, Nuevo Leon, 28 June 1970, E. M. and J. L. Fisher (EMF).

Record. Rusk County, Texas, 18 June 1940, D. J. and J. N. Knull.

REMARKS. A male of *Polacantha sinuosa* collected at Pedricena, Durango, is unusually small, being only 12 mm. in length.

Polacantha (Polacantha) tridens Martin, new species. (Figure 44.)

The absence of denticles on the dorsomesal margin of the epandrium, the ventral aedeagal tubes subequal to the median tube, the anterior black fascia on all femora, and the blackish antennae separate *Polacantha tridens* Martin from other species of *Polacantha*.

Male. Length 12 mm. Head black; face yellowish white tomentose, front and vertex orange-brown, occiput gray tomentose; vestiture whitish except frontal, antennal, and strong occipital bristles black; antennal segments 1 and 2 dark red, segment 3 black with a yellow base, microsegment and style blackish; segment 3 subequal to style, microsegment about 1/4 as long as segment 3, segment 1 subequal to segment 3.

Thorax black except narrowly red on posterior humeri; yellowish red-brown tomentose, the broad median stripe subshining brown, more densely pollinose posteriorly, suddenly constricting to a narrow subshining stripe on posterior declivity, medially the broad stripe a lighter brown, laterally narrow short reddish brown stripes; vestiture black, pale hairs along posterior margin of mesothorax; scutellum black, gray tomentose, short pale pile on disc, posterior margin with a pair of strong pale bristles; pleura black, brownish gray tomentose, vestiture pale.

Abdomen blackish, reddish brown tomentose, laterally and posteriorly light brown tomentose; ventral aedeagal tubes subequal to aedeagal sheath.

Wings hyaline.

Legs reddish yellow, a distinct fascia anteriorly on all femora, hind tibiae with short apical black band on each.

Female. Unknown.

TYPE MATERIAL. Holotype: male, 21 miles south Zimapan, Hidalgo, Mexico, 4 July 1959, Charles H. Martin (CAS). Paratypes: Mexico: Zimapan, Hidalgo, 6400 ft., 12 June 1956, H. A. Scullen; 1 male, 14 mi. NW. Izmiquipan, Hidalgo, 2 September 1965, E. M. Fisher; 2 males, 5 mi. W. Durango, Durango, 6500 ft., 11 and 14 July 1964, J. E. H. Martin, W. R. M. Mason.

Polacantha (Echinitropis) Martin, new subgenus

Type-species. *Asilus xanthocerus* Williston, 1901.

The new subgenus *Polacantha (Echinitropis)* Martin (Echinis: spiny; tropis: keel; feminine) differs from the nominate *Polacantha (Polacantha)* Martin by the spined processes projecting mesad from the spiny inner surface of each epandrium. The general habitus of *Polacantha (Echinitropis)* is similar to *Polacantha (Polacantha).*

Polacantha (Echinitropis) xanthocera (Williston), new combination.
(Figure 60.)

Asilus (Heligmoneura) xanthocerus Williston, 1901, Biologia Centrali-Americana, Diptera, Suppl., p. 329. Syntypes: British Museum (Natural History).

Length 26 mm. The general coloration is shades of yellow including the yellowish white face, antennal segments 1 + 2 twice as long as segment 3, style twice as long as segment 2, slightly swollen apically.

The aedeagal sheath of the syntype at hand is nearly straight apically, but is hooklike in another syntype at the British Museum.

Vestiture ranges from white to yellow except the antennal and thoracic bristles are black.

Polacantha (Echinitropis) pegma Martin, new species.
(Figure 59.)

Male. Length 17 mm. Blackish species. Head black; face pale yellow tomentose, front, vertex, and occiput gray; mystax pale yellow, antennal bristles and upper occipital bristles black, laterally yellow; antennal segments 1 and 2 dark red, almost black, segment 3 and microsegment black, style reddish black; segment 3 subequal to style, microsegment about 1/4 as long as style.

Thorax black, dark red metapleura; dark tomentose dorsally, grayish to brown laterally and posteriorly, median stripe abraded, but reddish brown on anterior declivity; vestiture black; scutellum pale brown tomentose, pile pale, a pair of long black bristles on posterior margin; pleura brown and gray tomentose.

Abdomen black; tergites dark brown tomentose, gray anteriorly and along lateral margin, incisures mostly brown with some gray pollen; dorsally tergites with short recumbent black bristles, laterally yellowish hair, long yellow bristles laterally along incisures and on sternites; left epandrium on inner surface near dorsomesal margin with a long black triangular process flattened, parallel to mesal plane, and projecting from a basal half as long as the

process, with black bristles, right epandrium medially on inner surface with a long erect narrow triangular process with black bristles, strong black bristles anteriorly and above the process.

Wings lightly infuscated.

Legs reddish, dark fascia anteriorly on femora.

Female. Unknown.

TYPE MATERIAL. Holotype: male, San Diego, California, 7 August 1935, Jean Russell (KU).

PROLATIFORCEPS Martin, new genus

Type-species. *Asilus melanocerus* Williston, 1901.

The genus *Prolatiforceps* (prolatus: elongate; forceps: epandria; feminine) is erected for 10 North American species of Asilidae. Williston (1901) assigned five species to the Palearctic genus *Asilus* Linnaeus, placing them in the subgenera *Asilus*, *Heligmoneura* Bigot (an Oriental genus), *Neoitamus* Osten Sacken, *Machimus* Loew, and *Tolmerus* Loew.

As Williston's subgeneric assignments indicate, part of the characters of *Prolatiforceps* are a combination of the major characters for several genera which are both allopatric and sympatric with *Prolatiforceps*. The weak gibba and chaetotaxy of four species of *Prolatiforceps* resemble those of *Cerdistus* Loew, but the two genera are allopatric in North America. The epandria and aedeagi of *Prolatiforceps* and *Cerdistus* are dissimilar. The strong gibba and straight posterior margin of sternite 8 of six other species could relate them to the sympatric Tolmerus Group of *Machimus*. The long slender bristles laterally on the incisures, the pile on the sternites, the male genitalia, and the abdomen help to separate the genus *Prolatiforceps* from other Asilini genera.

Prolatiforceps ranges from 10 to 19 mm. in length; the third antennal segment 4-5 times longer than wide; occipital bristles apically bent anteriad or posteriad, in some species curved posteriad, mixed with straight bristles.

Thorax dorsally with long dorsocentral bristles extending beyond the transverse suture, other vestiture sparse to abundant and erect to semirecumbent, depending on the species, bristles on posterior margin of scutellum vary from 2 to 10, disc with or without hair.

Abdomen, stout to slender depending on the species, more or less elongate; except for one species, predominantly some shade of brown or tan with variable amounts of gray; tergite 2 laterally with variable amounts of long erect pile; laterally incisures with long slender bristles; epandria elongate, narrow, dorsal and ventral margins usually parallel, any apical notches horizontal, apicomesal margins with or without serrations which range from one to several; when several serrations are present the number is variable within a species.

In most species of *Prolatiforceps* the legs are long with the femora and tibiae varying from stout to slender. Four species from Omilteme, Mexico, center of distribution of the genus, have long slender legs, the other two Omilteme species have stouter and shorter legs.

DISTRIBUTION. The type-locality of six of the 10 species of *Prolatiforceps* is Omilteme, 8000 feet elevation, Guerrero, Mexico; one of the six is described here as new. *Asilus neariacensis* Bromley, *Asilus infuscatus* Bellardi from Mexico, and *Asilus fulviventris* Schaeffer from Arizona are recombined with *Prolatiforceps*. Also, a new species is described from northern Arizona. The genus is found in forested areas from 5000 ft. to 10,500 ft. in Mexico, and from 5000 ft. to 7000 ft. in Arizona.

Key to *PROLATIFORCEPS* in North America

1. Tibiae reddish or brownish yellow, with or without brown to black markings 7
   Both tibiae and femora totally black 2

2(1). Fore femora ventrally with numerous black, or black and pale, long hairlike bristles 4
   Fore femora ventrally with a row of sparse white or yellowish long hair-like bristles 3

3(2). Front usually brown pollinose; hind femora dorsally with recumbent yellowish hair, anterior four femora dorsally with black vestiture; length 12-14 mm. (Guerrero).....
   ..... *anonyma* (Williston)
   Front gray pollinose; hind femora dorsally with recumbent white hair; anterior four femora dorsally with white hair; length 12 mm. (Arizona) [Synonym *A. knulli* Bromley].....
   ..... *fulviventris* (Schaeffer)

4(2). From a lateral view thoracic dorsum laterally and pleura gray and brown; disc of scutellum gray 6
   From a lateral view, thoracic dorsum laterally, pleura, and disc of scutellum brown 5

5(4). From dorsal view, thorax laterally yellowish brown; fore tibiae dorsally with semi-erect vestiture; epandrial ventral margin nearly straight; length 16-17 mm. (Guerrero)..... ..... *fenestella* Martin, new species

From a dorsal view thorax laterally reddish light brown; fore tibiae dorsally with recumbent vestiture; apex of epandrium curves ventrad; length 15-16 mm. (Neriaco, Mexico)... ..... *neariacensis* (Bromley)

6(4). Face brown, in dorsal view lateral margin of thorax light brownish yellow anteriorly, gray posteriorly; bristles before halteres black; length 15-18 mm. (Guerrero)..... ..... *capillata* (Williston)

Face gray below, brown above; in a dorsal view, lateral margin of thorax gray with brownish tinge anteriorly; bristles before halteres yellow; length 17-19 mm. (Guerrero).. ..... *nigrocaudata* (Williston)

7(1). Both femora and tibiae red 9
Femora black, tibiae red 8

8(7). Front brown; thorax yellowish brown with some gray, stripes dark brown; bristles before halteres yellow; ventral process at hinge and at base of proctiger; length 13-16 mm. (Guerrero; Michoacán; Durango; Morelia)..... *dolichomera* (Williston)

Front gray; thorax gray with brown markings; bristles before halteres white; no ventral processes on proctiger; length 9 mm. (Arizona).... ..... *thulia* Martin, new species

9(7). Gibba strong, face white; epandria single-toothed on mesoapical margin at 7/9 of distance from base; length 17 mm. (Vera Cruz; Nuevo Leon)..... ..... *infuscata* (Bellardi)

Gibba weak; epandria serrate on mesoapical margin; length 14-16 mm. (Guerrero).. ..... *melanocera* (Williston)

Prolatiforceps anonyma (Williston), new combination. (Figures 57, 68.)

Asilus anonymus Williston, 1901, Biologia Centrali-Americana, Diptera, Suppl., p. 330.

REDESCRIPTION. *Male*. Length 12-14 mm. Head black; face yellow to yellowish white tomentose, front and vertex brown tomentose, occiput gray tomentose, brownish above; oral margin with white bristles, facial, frontal, and ocellar bristles black; antennal segments 1 and 2 and 2-segmented style about equal in length, segment 3 slightly longer.

Thorax black; from an oblique lateral view blackish brown, from above yellowish brown pollinose laterally, grayish on posterior declivity, median and lateral stripes confluent, brown pollinose, median stripe constricted posteriorly, more or less triangular black spots below lateral stripes, posteriorly on declivity bare of hair between dorsocentrals, setulae long, hairlike, black, mostly along median stripe; scutellum black, gray pollinose intermixed with some brown, hair on disc sparse; pleura gray pollinose, brown before wing base, gray below.

Abdomen black, from above dark reddish brown, incisures lighter, tergite 2 subshining, thinly gray pollinose on anterior third, brown posteriorly, tergites 3-7 reddish brown pollinose, incisures brownish yellow, laterally gray pollinose; epandrium serrate on apicomesal margin, slightly expanded on ventromedial margin; aedeagus tapers to a single tube.

Wings infuscated reddish brown, posterior cell 4 with a spot and petiolate, anal cell petiolate.

Legs black, hind femora long; anterior four femora dorsally with black bristles, ventrally each with a row of long pale hairlike bristles.

DISTRIBUTION. Type-locality, Omilteme, 8000 feet elevation, Guerrero, Mexico, August, H. H. Smith. Mexico: 9 mi. W. Palmitas, highway 40, kilometer post 1068, Sinaloa, 31 August 1962, Dorothy W. Martin.

Prolatiforceps capillata (Williston), new combination.

Asilus (Neoitamus) capillatus Williston, 1901, Biologia Centrali-Americana, Diptera, Suppl., p. 330.

Williston (1901) assigned *Asilus capillatus* to the subgenus *Neoitamus*. The occipital bristles mostly straight, but a few bent forward near the apex, female tergites 6 and 7 pollinose, legs and male genitalia unlike *Neoitamus*. In the British Museum (Natural History) the species was assigned to *Cerdistus*, but the gibba of this genus is much more robust than for *Neoitamus*.

REDESCRIPTION. *Male.* Length 19 mm. Robust. Head black; face orange-yellow tomentose, grayish below eyes, gibba thinly orange-yellow tomentose, nearly bare laterally and above tubercle, front thinly grayish pollinose, appearing yellow from a posterior view, ocellar tubercle and below angle of eye black encroaching deeply on occiput, ocellar tubercle's posterior ridge and occiput gray pollinose; vestiture on upper occiput black, rather dense, hair on lower occiput pale; yellow bristles on oral margin and lower part of face, above bristles black; antennal, frontal, and ocellar bristles black; antennae black, length of segments 1+2 equal to segment 3, style slightly shorter.

Thorax black; median and lateral stripes confluent, thinly blackish brown pollinose, at some views a gray stripe anteriorly separating lateral and median stripes, laterally before transverse suture yellowish brown pollinose, posteriorly and posterolaterally to transverse suture gray pollinose, from a lateral view thorax black, thinly brown pollinose, triangular black spots below lateral stripes; vestiture black, setulae long, sparse, erect medially, recumbent hairs between dorsocentrals; scutellum black, thinly gray pollinose, more densely posteriorly, hair on disc black, eight long hairlike bristles on margin; pleura brown pollinose anteriorly, gray posteriorly.

Abdomen black; from an oblique posterior view tergites 2-7 dark brownish pollinose, incisures gray pollinose, from a lateral view tergite 2 appears gray and brown pollinose, more densely gray on lateral posterior corners, tergites 3-4 laterally with thin blackish spots, tergites 6-8 dark brown pollinose; vestiture mostly yellow; epandria truncate apically, strong bristles on inner face at apex, a very shallow serration on apicomesal margin, aedeagus modified apically, with three microtubes.

Wings heavily infuscated, spot in cell 4 almost merges with infuscation of cell 3.

Legs black, hind femora with pale hair dorsally, laterally black, ventrally with long white hair and a few black bristles, vestiture of fore femora black.

Female. Similar to male.

DISTRIBUTION. Type-locality, Omilteme, 8000 feet, Guerrero, Mexico.

Prolatiforceps dolichomera (Williston), new combination. (Figures 55, 64.)

Asilus (Heligmoneura) dolichomerus Williston, 1901, Biologia Centrali-Americana, Diptera, Suppl., p. 329.

Prolatiforceps dolichomera (Williston) is the only species in the genus with ventral processes at the hinge of the proctiger and second processes at the base. The coloration of the species is variable.

REDESCRIPTION. *Male*. Length 13 mm. Head black; face grayish tomentose to yellowish brown, weak gibba same color as face, but changing to white at some angles of view, front light brown tomentose, sometimes with gray, vertex behind ocellar tubercle brown to yellowish white, blackish triangular spots on vertex, occiput yellowish gray tomentose, two lateral darkened bare spots below occipital bristles; mystax mostly yellowish white with a few black bristles above, frontal, ocellar, and occipital bristles black, a few dark hairs dorsally on antennal segment 3; antennae black, segment 3 slightly longer than segments 1 and 2 together, style about 2/3 as long as segment 3.

Thorax black; from a dorsal view lateroanteriorly yellow pollinose, gray posteriorly, from a lateral view gray to yellow pollinose, median and lateral stripes dark brown pollinose, confluent anteriorly but separated posteriorly by brown pollinose stripes, median stripe constricts posteriorly, posterior declivity gray pollinose; dorsocentral bristles extend halfway beyond transverse suture, long black setulae anteriorly, pale posteriorly; scutellum black, yellowish gray pollinose, sparse long white bristles on disc, four long black bristles on posterior margin; pleura black, yellowish gray anteriorly, gray posteriorly, bristles before halteres pale brown, metanotal callus bristled.

Abdomen black; dorsally brown pollinose, laterally brown or brownish gray, tergites 2-5 laterally with thinly pollinose stripes, at an oblique angle of view tergites 2-5 orange-brown laterally with blackish stripes anteriorly, incisures orange-brown dorsally, orange-brown to yellowish gray-brown laterally, tergite 2 with a black band near anterior margin, tergite 3 with an anterior narrow black band changing to gray with angle of view; tergites 2-5 with long yellow bristles on posterior margins, shorter dorsally; epandria serrate along apicomesal margin, ventroapex pointed, slightly bent ventrad; aedeagus a long isoceles triangle with a small long apical tube.

Wings slightly infuscated, darkened apically, posterior cell 4 long petiolate, anal cell shorter petiolate.

Legs slender, long, femora black, tibiae reddish yellow, darkened apically; bristles on femora mostly pale.

Female. Similar to male; gray face not as changeable as in male.

Prolatiforceps dolichomera is a variable species. Male specimens from Amula, Mexico have the apices of the tibiae black, two others have an indefinite black line on each tibia. The tibiae of some females are not darkened. Specimens from Omilteme do not have darkened tibiae.

DISTRIBUTION. Type-locality, Amula, 6000 feet, Guerrero, Mexico, August, H. H. Smith. I have specimens from Distrito Federal, Durango, Michoacán, Morelia, Oaxaca, and Sinaloa.

Prolatiforceps fenestella Martin, new species.
(Figures 56, 61.)

The general appearance of the black-legged *Prolatiforceps fenestella* Martin (fenestella: small window, referring to the tear-shaped window at the apex of the aedeagus) is similar to *P. capillata* (Williston). The thorax of the latter is more robust and the scutellum gray, while the thorax of the former is narrower and the scutellum brown pollinose. The aedeagi are not similar.

Male. Length 18 mm. Head black, gibba strong, covering 2/3 of face; face orange-brown tomentose, gibba subshining orange-brown pollinose, front orange-brown to brown pollinose, some gray intermixed; vestiture of head long, black with a few yellow bristles medially on oral margin, yellow pile on ventral half of head; antennae black, style and segments 1 + 2 subequal to length of segment 3.

Thorax black; from dorsal view yellowish pollinose, broad median stripe dark reddish brown, tapering posteriorly to scutellum; lateral spots reddish brown becoming small at some angles of view, small brown spots above and below the larger spots, appearing and disappearing with the angle of view; black dorsocentrals extending to anterior declivity; shorter black hair between dorsocentrals, long black hair laterad and over posterior declivity; scutellum dark reddish, thinly brownish pollinose medially, more densely around margin, long black hair on disc, eight long bristles on posterior margin; pleura yellowish to grayish brown pollinose, patch of long black hair before wing base, reddish pile and hair above midcoxa, fan of yellow bristles before halteres.

Tergites from dorsal view dark reddish brown dorsally, reddish yellow on posterior corners and ventral margins, at other angles of view tergites brownish reddish yellow with dark brown elongate spots medially, incisures brownish yellow, dark spots around bases of the long yellowish vestiture, epandrium 4 times longer than wide, truncate apically, mesal margin straight, without serrations.

Wings deeply infuscated.

Legs black, not slender.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, Omilteme, 8000 feet, Guerrero, Mexico, 18 September 1960, Chas. H. Martin (CAS). Paratypes: 4 males, 1 female, same data as holotype.

Prolatiforceps fulviventris (Schaeffer), new combination.

Asilus fulviventris Schaeffer, 1916, Jour. New York Ent. Soc., vol. 24, p. 69.
Asilus knulli Bromley, 1940, Bull. Brooklyn Ent. Soc., vol. 35, p. 17. New synonym.

REDESCRIPTION. *Male.* Length 14 mm. Head black; face gray tomentose with a tinge of brown, from a lateral view bronze yellow, front mixed brown and gray, occiput gray tinged with brown; mystax bristles yellowish white below, black above, antennal vestiture black and white, frontal and ocellar bristles black, upper occipitals strong, black, pile pale yellowish white; antennae blackish brown, antennal segment 1 twice as long as segment 2, segment 3 narrow elongate, equal to the length of segments 1 + 2, style slightly longer than segment 1.

Thorax black, bronze-yellow pollinose, median stripe broad, dark brown, large lateral spots brown with transverse pale line between, separated from median stripe; anteriorly mesonotum with short erect black bristles, dorsocentrals long posteriorly, shorter anteriorly, posterior declivity with weak black bristles shorter than dorsocentrals; scutellum gray tomentose, both pale and black bristles on disc, posterior margin with three black and two pale long bristles; pleura gray tomentose, pile white, posterior bristles yellow.

Abdomen black; dark yellowish brown pollinose, some specimens with incisures pale yellowish brown, others with incisures gray spotted laterally, tergite 2 gray anteriorly; long yellowish bristles on posterior margin, longer laterad than dorsolaterad, tergites with short recumbent yellowish bristles; epandrium 4 times longer than wide, aedeagus tapering to three short apical tubes.

Wings pale, washed brown.

Legs black, slender, moderately long.

DISTRIBUTION. Type-locality, Arizona: Carr Canyon, Huachuca Mts., 5 August 1924, J. O. Martin (CAS); Madera Canyon, 6500 ft., Santa Rita Mts., 27 September 1970, Chas. H. Martin (CHM).

Prolatiforceps infuscata (Bellardi), new combination.

Asilus infuscatus Bellardi, 1861, Saggio di Ditterologia Messicana, Parte II, pt. 2, p. 156.
Machimus (Tolmerus) infuscatus; Martin and Papavero, 1970, A Catalogue of the Diptera of the Americas South of the United States. Museu de Zoologia, Universidade de São Paulo, fasc. 35b, Family Asilidae, p. 86.

I am assigning *Asilus infuscatus* Bellardi to *Prolatiforceps* having one specimen of this species from El Fortin, Vera Cruz, Mexico, two from Jalapa, Vera Cruz, Mexico, and

three from El Cerado, Nuevo Leon, Mexico. Each male in the series with a tooth on the mesal surface of the epandrium at 7/9 the distance from the base; femora yellow with apical brown bands and brown fascia dorsoanteriad on the Jalapa and El Cerado specimens, and femora darkened dorsally on the El Fortin specimen. The syntype of Bellardi has black femora, epandrium single-toothed at 7/9 the distance from the base. The type-specimen resembles my specimens in other details.

The Jalapa, El Fortin, and El Cerado specimens have basistylus long, narrow, apically spatulate.

Notes on Bellardi's male type-specimen which is partially covered with mold (1961): Length 17 mm. Head black; front yellowish brown tomentose, occiput gray tomentose laterally, brown on disc; occipital bristles black, strong.

Thorax yellowish brown tomentose, white tomentose on posterior declivity; dorsocentrals, sparse erect setulae; scutellum shiny black, white tomentose, two short erect black bristles on disc, several on posterior margin; pleura gray tomentose, brown tomentose before wing base.

Abdomen black; tergite 2 gray tomentose, yellow tomentose at an oblique angle of view, tergites 3-6 yellow tomentose from view above, from a posterior view brown tomentose, tergites 2-5 gray laterally, incisures brown pollinose dorsally, gray laterally; aedeagus 3-tubed.

Wings infuscated at tips and on costa, hyaline basally.

Legs slender, long, femora black, tibiae dark red, black apically.

DISTRIBUTION. Type-locality, Messicana, Salle.

Prolatiforceps melanocera (Williston), new combination. (Figures 51, 62.)

Asilus (Heligmoneura) melanocerus Williston, 1901, Biologia Centrali-Americana, Diptera, Suppl., p. 329.

Machimus (Tolmerus) melanocerus; Martin and Papavero, 1970, A Catalogue of the Diptera of the Americas South of the United States. Museu de Zoologia, Universidade de São Paulo, fasc. 35b, Family Asilidae, p. 86.

I have five male and three female topotypes of *Prolatiforceps melanocera* (Williston) collected at Omilteme, 8000 feet, Guerrero, Mexico, 18 September 1960, Martins. The reddish brown legs with hind femora and tibiae slender and long, the lateral thoracic stripes separate from the median stripe, as in *P. anonyma* (Williston), epandria long, rounded on apicodorsal margin, apical point bent slightly ventrad, apicomesal margin shallowly serrate, proctiger with ventral processes at the hinge and a pair at the base, aedeagus of *P. melanocera* a long isoceles triangle dividing apically into three slender tubes. Abdomen of *P. melanocera* longer than that of *P. anonyma*. While the two species are closely related, the characters in the key will separate them. Length 17 mm.

DISTRIBUTION. Type-locality, Omilteme and Xucumanatlan, 7000-8000 feet, Guerrero, Mexico. Topotypes: Mexico, Omilteme, 8000 ft., 18 September 1960, Dorothy W. Martin, Chas. H. Martin.

Prolatiforceps neariacensis (Bromley), new combination. (Figures 54, 63.)

Asilus neariacensis Bromley, 1951, Amer. Mus. Novitates, no. 1532, p. 34.
Machimus (Tolmerus) neariacensis; Martin and Papavero, 1970, A Catalogue of the Diptera of the Americas South of the United States. Museu de Zoologia, Universidade de São Paulo, fasc. 35b, Family Asilidae, p. 86.

Bromley (1951) considered *Prolatiforceps neariacensis* as related to *P. fulviventris* (Schaeffer) even though the former has a strong gibba and the latter a weak gibba. Both have long slender epandria.

Length 17-19 mm. Epandrium emarginate apicoventrally, forming a rounded apicoventral lobe, mesal margin without serrations, aedeagus tapering to a broad apex with three small tubes.

DISTRIBUTION. Type-locality, Neariaco, Mexico, 10,500 feet. I found a dozen specimens belonging to the type series, but not designated as such, in the American Museum of Natural History. I placed topotype labels on these specimens.

Prolatiforceps nigrocaudata (Williston), new combination. (Figure 52.)

Asilus (Neoitamus) nigrocaudatus Williston, 1901, Biologia Centrali-Americana, Diptera, Suppl., p. 329.
Machimus (Tolmerus) nigrocaudatus; Martin and Papavero, 1970, A Catalogue of the Diptera of the Americas South of the United States. Museu de Zoologia, Universidade de São Paulo, fasc. 35b, Family Asilidae, p. 86.

Prolatiforceps nigrocaudata (Williston) has only part of the occipital bristles bent anteriad at the apices. Tergites 6-7 of the female are polished, but the sternites are pollinose. The epandrium of a syntype with ventral margin curved, a slender tooth at apex of the nonserrate mesal margin, aedeagal sheath slender, longer than the lateral tubes.

DISTRIBUTION. Type-locality, Omilteme and Xucumanatlan, 7000-8000 feet, Guerrero, Mexico. Mexico: Morelia, Michoacán, 22 September 1957, R. and K. Dreisbach (CHM).

Prolatiforceps thulia Martin, new species.

Prolatiforceps thulia Martin, the only dominantly gray species in the genus, represents the northern limits of the genus in Grand Canyon, Arizona.

Male. Length 11 mm. Gibba weak, head black; face, front, and occiput at some angles of view gray, large brownish spots on disc of the occiput at other angles of view; mystax with white bristles, a few black on upper gibba, antennal vestiture black and white, segment 3 with brownish recumbent bristles dorsally, frontal bristles black, five ocellar bristles long, pale, occipital bristles strong, long, black and white, pilelike hair pale; antennae black, segment 1 twice as long as segment 2, segments 1 + 2 equal to length of segment 3, and of the style.

Thorax black; gray pollinose, geminate median stripe dark brown, on posterior declivity a single median stripe nearly disappearing at some angles of view, lateral stripes dark brown, transverse suture gray; dorsocentral bristles black, nearly reaching anterior margin of lateral spot, pale hair on posterior declivity; scutellum gray pollinose, a pair of black bristles on posterior margin; pleura gray, vestiture sparse.

Tergites 1-3 dorsally broadly gray, narrowly brown posteriorly, segments 4-7 more brownish; tergite 2 laterally with semi-erect pale hair, tergites covered with recumbent short white bristles, posterior margins of tergites 3-4 with long white bristles laterally, and several shorter ones more dorsally; epandrium 4 times longer than wide, apicomesal margin with widely spaced serrations, apically slightly obliquely truncate, epandrium tapering apicad, apex with three small tubes of nearly equal length.

Wings pale grayish brown, costal cell slightly darker.

All femora black, covered with recumbent white hair, bristles both black and white, tibiae reddish yellow, darkened apically, long slender white bristles.

TYPE MATERIAL. Holotype: male, Grand Canyon, Arizona, 20 August 1939, E. C. Van Dyke (CAS). Paratype: 1 male, McNary, Gooseberry Creek, Apache Co., Arizona, 4 August 1962, Dorothy W. Martin.

WILCOXIUS Martin, new genus

Type-species. *Wilcoxius truncus* Martin, new species.

The new genus *Wilcoxius* Martin is erected for *Asilus lestes* Williston and three new species of Asilini, two being Mexican, and the third ranging from Guatemala to Costa Rica; the weak gibba of *Wilcoxius* is similar to that of *Cerdistus* Loew, *Heligmoneura* Bigot, and other genera. Style of antennae apically weakly swollen; erect, long bristles on posterior half of thorax; no patch of bristles on metanotal callus; long bristles on posterior margin of scutellum; 1-3 erect bristles laterally on incisures; epandrium truncate,

or with a median triangle on truncation; in some species hypandrium either bifurcate or slit medially; tergites 8-10 of female as long as or longer than 6-7; posterior cell 4 and anal cell petiolate.

Wilcoxius acutulus Martin and *W. truncus* Martin are similar in having the apex of the aedeagal sheath curved basad and with 3 long apical tubes, similar epandria, and short stout white sternal bristles. Apically the aedeagus of *W. crenus* Martin is only partially curved basad, but it still resembles the first two species. The 3 aedeagal tubes of *W. lestes* (Williston) are directed basad, but the apex of the aedeagal sheath does not recurve basad. The lack of sternal bristles, the black and red legs, and the medially slit hypandrium relates *W. lestes* to *W. crenus*.

The genus is named *Wilcoxius* for my colleague Mr. Joseph Wilcox of Anaheim, California who has done so much to extend our knowledge of the Asilidae of the western United States. The genus *Wilcoxia* James (Dasypogoninae, Asilidae) was also named for Mr. Wilcox.

Key to the Species of *WILCOXIUS*

1. Mystax bristles totally white; hind femora totally black; some sternites with 1 or 2 strong whitish bristles on lateral margin of incisures 3
   Mystax bristles white, a few black bristles; hind femora partially red; sternites without strong bristles; at certain angles of view long narrow brown lines medially on tergites 2

2(1). Hind femora red, black fascia anteriorly; a few black hairs in mystax; hypandrium bifurcate with long white hairs on inner margins; length 10 mm. (Chiapas)..... *crenus* Martin, new species
   Hind femora black, narrow red bands basally and apically on males, broader red bands on females; mystax of male medially with black bristles to oral margin, female with black bristles not reaching oral margin; hypandrium slit, dense long white hairs on apical margin; length 9 mm. (Morelos; Guerrero)..... *lestes* (Williston)

3(1). Male epandrium pointed medially on apex; from above tergites grayish yellow on posterior margins, tergites 2-6 brown anteriorly; length 10 mm. (Nicaragua)..... *acutulus* Martin, new species

Male epandrium truncate; dorsally tergites yellow, at an oblique angle brownish to incisures; length 11 mm. (Vera Cruz, Mexico)..... *truncus* Martin, new species

Wilcoxius acutulus Martin, new species.
(Figure 47.)

Color and markings of *Wilcoxius acutulus* Martin similar to *W. truncus* Martin, the former being grayer. Epandrium of *W. truncus* truncate, but that of *W. acutulus* with a broad sharp tooth medially on truncation; tergites 4-6 of female of *W. acutulus* laterally narrowly gray tomentose, of *W. truncus* broadly yellowish gray tomentose.

Male. Length 10 mm. Head black, gibba weak; face grayish yellow tomentose, at an oblique angle from above orange-yellow, front brownish yellow, ocellar tubercle anteriorly brown, vertex reddish brown-yellow, broad black spots on orbitals, occiput mixed gray and yellow tomentose; mystax and lower facial bristles yellowish white, frontal bristles long, bristles on upper occiput strong, black, laterally weak and yellowish white; antennae black, brown tomentose, segment 1 half as long as segment 2; style and also segment 3 subequal to length of segments 1+2, style slightly swollen apically.

Thorax black; dorsally reddish brown tomentose, yellowish laterally, median stripe reddish brown, expanded anteriorly, tapering posteriorly, short fork on posterior apex, from a lateral view median stripe with an elongate yellowish stripe dividing the expanded portion, lateral stripes brown, transverse suture and along median stripe yellow, posterior declivity with one short and one large brown spot; sparse upright bristles anteriorly, sparse long yellow hairs on posterior declivity, strong bristles either yellow or black; scutellum black, gray to brown tomentose, yellowish pile on disc, strong yellow bristles on posterior margin; pleura black, gray to brownish tomentose, vestiture yellow.

Abdomen black; tergites with reddish brown tomentose rectangles anteriorly, yellowish tomentose posteriorly and laterally, tergites 2-6 each with a single strong yellowish white bristle lateroposteriorly, sternites 2-5 with similar bristles, from a lateral view tergites reddish brown dorsally, grayish tomentose laterally.

Wings palely infuscated; cell 4 and anal cell closed.

Femora black, tibiae reddish, hind tibiae narrowly reddish brown on apices.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, Condega, Nicaragua, 2025 feet elevation, 6 July 1963, Scullen and Bolinger (CAS). Allotype: female, same data as holotype (CAS). Paratypes: 6 females, 2 males, same data as holotype and allotype. El Salvador: 1 male, 5 mi. W. Rio Lempa bridge, 3 July 1965, Freytas and Gibson.

Wilcoxius lestes (Williston), new combination.
(Figures 50, 65.)

Asilus lestes Williston, 1901, Biologia Centrali-Americana, Diptera, Suppl., p. 331.

Williston (1901) described two females of *Wilcoxius lestes* from Chilpancingo, Guerrero, Mexico, with segment 1 of the ovipositor long and segment 2 short. I have females from the adjacent state of Morelos with ovipositors similar to my photographs of the syntypes at the British Museum (Natural History). The male is described here for the first time.

Male. Length 9 mm. Head black, weak gibba; face, front, vertex, and occiput grayish tomentose; facial bristles mostly white, black bristles medially extending from gibbal apex to oral margin; occipital bristles white; antennal segments black, grayish tomentose, antennal segment 2 subequal to segment 1, segment 1 subequal to short pear-shaped segment 3, style nearly twice as long as segment 3, slightly swollen apically.

Thorax black; gray tomentose, median brown stripe terminating just beyond gray transverse suture, anteriorly separated by a gray to yellowish brown wedge with short recumbent bristles on it, lateral stripes brown, dorsocentrals short anteriorly, long posteriorly; scutellum mostly gray tomentose, on disc long pale weak bristles, posterior margin with two strong long white bristles; pleura black, red around wing base, gray tomentose, vestiture whitish.

Abdomen black, posteriorly red laterally, narrow black median stripes; median dark brown tomentose stripe, gray tomentose along ventral borders, tergites 2 and 3 brown dorsally, tergites 5-7 reddish brown dorsally; tergites 2-4 laterally on incisures with 2-3 white upright bristles.

Wings pale brownish, posterior cell 4 and anal cell closed.

Hind femora black, narrow red bands apically and basally.

Female. Similar to male, broader red bands on hind femora.

RECORDS. Mexico: 2 mi. S. Alpyeka, Morelos, 14-28 May 1959, 3000 ft., H. E. Evans; Las Estacas, 6 April 1959, 3000 ft., H. E. Evans; Cuernavaca, 21 May 1959, 5500 ft., H. E. Evans.

Wilcoxius crenus Martin, new species.
(Figures 49, 67.)

The bifurcate, elongate hypandrium with long white hairs along the inner margin of cleft helps to identify the male of *Wilcoxius crenus* Martin; the epandrium is broad and truncate.

Male. Length 10 mm. Head black; face weakly gibbose, white tomentose, front, vertex, and occiput yellowish brown

tomentose, at some angles of view, orbitals grayish, at other angles white; mystax white with a few black bristles; antennae brownish, segment 1 about twice as long as segment 2, subequal to segment 3, the latter about half as long as style, pyriform, style slightly swollen apically.

Thorax black, lateral margins narrowly red, calli red; anterior calli gray tomentose, dorsally thorax grayish yellow-brown, median stripe reddish brown, terminating just beyond grayish transverse suture, lateral stripes brown; short erect black bristles on dorsum; scutellum yellowish grayish brown tomentose, two strong white bristles and hair-like bristles on posterior margin, sparse vestiture on disc; pleura red, pale yellowish gray-brown tomentose, vestiture pale; coxae gray tomentose.

Abdomen red, dorsomedially a median black stripe; yellowish brown tomentose, elongate brown spots medially, grayish yellowish brown laterally; tergites 2-3 with one or two erect white bristles laterally on incisures; metanotal calli without bristles; tergites 2-3 with short black bristles medially, pale bristles laterally, vestiture on other tergites pale; male genitalia red.

Wings yellowish brown, long, narrow; posterior cell 4 and anal cell petiolate.

Legs red, middle and hind femora with black fascia anteriorly.

Female. Unknown.

TYPE MATERIAL. Holotype: male, Nachic, Chiapas, Mexico, 27 April 1959, 8000 feet elevation, H. E. Evans (COR).

Wilcoxius truncus Martin, new species.
(Figures 46, 66.)

Male. Length 11 mm. Head black; face grayish to yellowish gray tomentose, at some angles a large upside down U on upper face, front yellowish grayish brown, vertex yellowish brown, ocellar tubercle a small brown spot, orbitals below ocellar tubercle with broad dark brownish spots, occiput brownish yellow; mystax bristles yellowish, bristles of antennal segment 1 both black and yellow, of segment 2 black, frontal bristles long, both black and yellow, upper occipitals mixed black and yellow, yellow on lower occiput; antennae black, brownish yellow tomentose, segment 1 1.5 times longer than segment 2, segments 1+2 about equal to length of segment 3, style black, shorter than segment 3, swollen apically.

Thorax black; from above yellowish brown tomentose, median stripe dark reddish brown, extending beyond transverse suture, small brown spots laterally, on posterior declivity laterad two large median brown spots; sparse erect short black bristles on dorsum, long bristles mostly yellow; scutellum black, yellowish brown tomentose, yellowish pile on disc, two yellow bristles on posterior margin; pleura black, yellowish brown tomentose anteriorly, gray

posteriorly, vestiture yellow; metanotal callus without vestiture.

Abdomen black, yellowish brown tomentose, at an oblique angle of view looking anteriorly rectangular spots anteriorly on tergites, from above black spots change to yellow; vestiture of recumbent whitish yellow short hairs, tergite 1 gray, tergites 2-6 with an erect whitish yellow bristle laterally on incisures, sternites 2-5 with similar bristles, recumbent whitish hair.

Wings lightly infuscated; posterior cell 4 and anal cell petiolate.

Femora black, tibiae yellow, darkened near apices.

Female. Similar to male.

TYPE MATERIAL. Holotype: male, Vera Cruz, Vera Cruz, Mexico, Highway 185, kilometer post 105, 14 July 1959, Dorothy W. Martin (CAS). Allotype: female, same locality, kilometer post 102, 14 July 1959, Dorothy W. Martin (CAS). Paratypes: Mexico: 7 males, 2 females, same localities as holotype and allotype, Dorothy W. Martin, Chas. H. Martin; 3 males, Tehuantepec, Oaxaca, Highway 190, kilometer post 975 at bridge, 15 July 1959, Chas. H. Martin.

FURCILLA Martin, new genus

Type-species: *Furcilla dorothyae* Martin, new species.

Furcilla Martin, new genus (furcilla: pitchfork, diminutive, feminine) has a narrow elongate epandrium, and patches of short sparse bristles lateroventrally on the hypandrium. Face slightly gibbous, similar to *Cerdistus* Loew, *Polacantha* Martin, and *Wilcoxius* Martin.

Face covered with bristles and hairs on lower 3/5; length of antennal segment 3 equal to segments 1 + 2, and also to the length of the style; dorsocentrals posteriad of transverse suture; four or more bristles on posterior margin of scutellum; strong bristles longer than other vestiture on lateroposterior margins of tergites. The genus is without vestiture on metanotal callus.

Furcilla dorothyae Martin, new species.
(Figure 48.)

The vestiture of the small *Furcilla dorothyae* Martin is white except black on the dorsum of the thorax and abdomen, and on tarsal segments. The short two-tubed aedeagus (fig. 48) of the male will readily identify the species. The species was collected in 1962 in an uncultivated desert area of southwestern Sonora, Mexico, but the area in 1965 was bulldozed for cultivation.

Male. Length 10 mm. Head black; face and occiput white, vertex brownish white; vestiture white, dense facial bristles extend 3/4 the distance to the antennae; gibba very weak;

antennae blackish, segment 1 with a narrow apical ring, about twice as long as segment 2, subequal to segment 3, style 3 times longer than segment 2.

Thorax black, humeri dark red; grayish brown tomentose, median stripe brown, indistinct, lateral stripes brown, rather indistinct, coalescing with median stripe, grayer on anterior calli and along lateral margins; short erect black bristles covering dorsum except for white hairs anterolaterally, two long dorsocentrals on posterior declivity; scutellum gray tomentose, long white hairs on disc and posterior margin, four whitish bristles in two rows on posterior margin; pleura black except wing base red; vestiture white.

Tergites 2-3 dark reddish, tergites 4-8 brighter red; gray tomentose, dorsally brown tomentose except incisures; mostly white vestiture on tergite 2, but tergites 3-5 with numerous short black bristles dorsally, more white bristles laterally and posteriorly, long strong white bristles on posterior margins of tergites 3-5, varying from 3-5 on each side; sternites without strong bristles on posterior margins.

Wings hyaline, shorter than abdomen.

Legs yellowish red, tibiae apically and tarsi darkened; vestiture white except no strong bristles, long white hairs posteriorly on anterior tibiae.

Female. Similar to male; tergite 7 polished, narrowly gray tomentose along ventral margins, black with posterior margins red, abdominal segment 8 equal in length to segment 7, tergite 10 extends half its length beyond tergite 9.

TYPE MATERIAL. Holotype: male, 11 miles south of Navajoa, Sonora, Mexico, Highway 15, kilometer post 1766, 3 September 1962, Dorothy W. Martin (CAS). Paratypes: 3 males, same data as holotype.

This species is named for my late wife, Dorothy Wylie Martin.

Furcilla petila Martin, new species.
(Figure 53.)

The short-tubed aedeagus relates *Furcilla petila* Martin to *F. dorothyae* Martin. The specific name (petila: slender) refers to the long slender epandrium notched apically. This unusual character will readily identify this Mexican species.

Male. Length 11 mm. Head black, grayish white tomentose, slightly brownish on front, vestiture white, dense, gibbal bristles extending over halfway to antennae; antennae black, style reddish, segments 1 and 2 white pollinose, segment 2 subequal to segment 1, length of segments 1 + 2 equal to length of short segment 3, also to style, segment 3 widest medially.

Thorax black, anterior and posterior calli dark red; yellowish brown tomentose, lateroanteriorly gray tomentose, median stripe indistinct, brown tomentose, coalescing with lateral stripes; dorsum covered with short semirecumbent

black bristles, long bristles confined to posterior declivity; scutellum grayish yellow tomentose, erect bristlelike hair on dorsum, 10 bristles on posterior margin; pleura black, gray tomentose, vestiture whitish.

Abdomen red, tergites 2-5 blackish anteriorly, reddish brown tomentose, incisures broadly grayish yellow, more narrowly posteriorly; dorsally recumbent short black bristles, white laterally, posterior margins of tergites 3-4 with strong whitish bristles longer than other vestiture.

Wings hyaline, short.

Legs reddish yellow, vestiture white except on tarsi.

Female. Unknown.

TYPE MATERIAL. Holotype: male, 5 miles east Navajoa, Sonora, Mexico, 11 August 1960, P. H. Arnaud, Jr., *et al.* (CAS).

WYLIEA Martin, new genus
Figures 74, 75, 76

Type-species. *Asilus mydas* Brauer, 1885.

The new genus *Wyliea* Martin is erected to receive *Asilus mydas* Brauer ranging from Morelos, Mexico to Mt. Lemmon, Arizona and the congeneric *Asilus chrysauges* Osten Sacken ranging from Oaxaca, Mexico to Panama.

Two long bristles on the apex of the apical tarsal segment projecting over the basal third or less of the tarsal claws (fig. 76); *Wyliea myaas* (Brauer), new combination, having a large pear-shaped aedeagus (fig. 74); and *W. chrysauges* (Osten Sacken), new combination, having a similar aedeagus but more angular, with a broad base, and the apical third tapering to an obliquely truncate apex with three aedeagal tubes, separate the species of *Wyliea* from other members of the Asilinae.

Hermann (1909) illustrated *Habropogon spissipes* Hermann (Dasypogoninae) as having a pair of strong bristles projecting over and subequal to the length of the tarsal claws rather than being a third or less the length of the claw as in *Wyliea*.

Face of *Wyliea* between antennae and apex of bristled gibba about as long as antennal segment 1; antennal segment 3, also style, about as long as segments 1 + 2; front above antennae about 1 1/2 times wider than vertex.

The metanotal callus bristled.

Vestiture of tergites not dense, short, longer on posterior margins, sternites with long hair and bristles, not dense; apically epandria emarginate, rounded ventral arm broader and longer than narrow sharply pointed dorsal arm, more deeply emarginate and upper arm also notched in *W. chrysauges*; segment 8 about 4/5 as long as epandrium, hypandrium narrow in width. Female abdominal segment 8 telescopes into segments 6-7, sternite 8 bulbous apically, tergite 10 subdivided into two short flattened lamellae.

Wings opaque, posterior cell 1 constricted medially by the arching of posterior cell 3.

This asiline genus is named *Wyliea* for my late wife Dorothy Wylie Martin who was an enthusiastic and knowledgeable collector of Asilidae.

Key to the Species of *WYLIEA*

Abdomen densely reddish yellow pollinose, vestiture erect, rather dense, reddish yellow fulvous, black bristles laterally; wing brown; length 28 mm. (Oaxaca, Mexico to Panama)..... ..... *chrysauges* (Osten Sacken)

Abdomen thinly black pollinose; vestiture mostly recumbent, black, tergites 3-5 posteriorly with orange bristles; wing brownish orange; length 28-32 mm. (Morelos, Mexico to southern Arizona) ..... *mydas* (Brauer)

DICROPALTUM Martin, new genus

Type-species. *Asilus rubicundus* Hine, 1909.

The new genus *Dicropaltum* Martin (dicro: forked; palton: light spear, neuter) is close to *Nigrasilus* Curran, but has a bifid rather than a trifid aedeagus. Length 7-10 mm. Facial gibba weak, gradually sloping into the face below the antennae. Style of antennae subequal to the length of antennal segment 3. Mesonotum without long bristles anteriorly, acrostichals on lower half. Scutellum with two strong bristles ventrad. Tergites without a patch of long bristles or pile laterad, lateroposteriorly one to three strong long bristles. Epandrium narrow. Ovipositor flat, without spines.

DISTRIBUTION. Wyoming; New Mexico; Kansas; Illinois.

Key to the Species of *DICROPALTUM*

1. Red species; hind femora red; style subequal to antennal segment 3; length 12 mm. (Kansas; Illinois)..... ..... *rubicundus* (Hine)

Black species; style short; hind femora totally black 2

2(1). Mystax bristles yellow below, white above; tergites 3-6 with longitudinal darker brown stripes medially and on incisures; length 7 mm. (Kansas; Wyoming)..... *pawneeae* Martin, new species

Mystax bristles totally white; tergites 3-6 with darker brown spots medially and on lateroposterior corners; length 8 mm. (New Mexico).....
..... *alamosae* Martin, new species

Dicropaltum alamosae Martin, new species.

Male. Length 8 mm. Head black, gibba weak, sloping into face below antennae; face, front, occiput gray tomentose, at some angles of view brownish; bristles in mystax white, confined to gibba, occipital bristles strong, whitish; antennae black, style about 1/4 as long as segment 3.

Thorax black; pale brownish tomentose, anterior callus gray, broad median reddish brown stripe narrowed on posterior declivity; scutellum black, brown to gray tomentose, a pair of white bristles on posterior margin, row of weak, nearly erect white bristles across the disc; pleura gray, golden brown in front and below wing base; vestiture white except short erect black bristles anteriorly.

Abdomen black; tergite 1 brown tomentose anteriorly, posterior margin gray, tergite 2 golden brown, mixed with gray on anterior and posterior margins, tergite 3 with grayish spot medially on anterior margin, from above tergites with darker medial longitudinal spots, similar but fainter spots on lateroposterior margins of tergites; male genitalia yellowish red, epandrium long, narrow, aedeagal sheath bifid; vestiture white to yellow, one long bristle which has above and below it shorter yellow bristles on lateroposterior corners of tergites 3-6.

Wings hyaline.

Femora black, tibiae reddish, darkened on apical three-fourths, vestiture mostly white.

TYPE MATERIAL. Holotype: male, Los Alamos, New Mexico, 26 July 1965, Chas. H. Martin (CAS).

Dicropaltum pawneeae Martin, new species.

Male. Length 8 mm. Head black, gibba weak, nearly on same plane with face below antennae; face and lower occiput yellowish white tomentose, oral bristles yellow, facial bristles white, strong orbital bristles yellowish; length of antennal segments 1 + 2 equal to segment 3, style short.

Thorax black; yellowish coppery brown tomentose, broad median stripe reddish brown, ending near transverse suture, acrostichals on posterior declivity, long hairs on posterior declivity sparse, white; scutellum black, yellowish brown tomentose, a pair of strong white bristles on posterior margin; pleura black, yellowish brown tomentose, vestiture sparse, white.

Abdomen black, yellowish brown tomentose, ellipsoidal dark brown spots medially on tergites 2-7, laterad incisures

nearly same brown as median spots; vestiture white, pair of bristles on lateroposterior corners of tergites stronger and longer than other vestiture, male genitalia red, epandria long, slender, aedeagus with a pair of flattened tubes.

Wings hyaline, pale brownish apically, anal and posterior cells closed petiolate.

Femora black, tibiae reddish, darkened anteriorly, vestiture white.

Female. Similar to male; ovipositor red.

TYPE MATERIAL. Holotype: male, Pawnee County, Kansas, 6 June 1947, Chas. H. Martin (CAS). Paratype: female, Glendo, Wyoming, 3 June 1958.

Dicropaltum rubicundus (Hine), new combination.

Asilus rubicundus Hine, 1909, Ann. Ent. Soc. Amer., vol. 2, p. 162.

DISTRIBUTION. Kansas; Illinois.

Genus *NEGASILUS* Curran

Negasilus Curran, 1934. Type-species, *N. belli* Curran (original designation).

Curran (1934) identified *Negasilus* Curran by the lack of marginal scutellar bristles and by the lack of lateral patches of bristles on tergites 2-6. The lack of bristles on the posterior margin of the scutellum is an unstable character. Some of my specimens of *N. belli* Curran are without such bristles while others have short recumbent bristles pointed laterad. James (1941) had a specimen of *N. mesae* (Tucker) without marginal scutellar bristles.

James (1941) noted the close resemblance of *Asilus mesae* to *Negasilus belli*. Adisoemarto (1967) considered *Asilus cumbipilosus* Adisoemarto and *A. aridalis* Adisoemarto to be close to *N. belli*. These three species and *Asilus gramalis* Adisoemarto are assigned to the genus *Negasilus*.

The genus *Negasilus* Curran has a short antennal style; face moderately convex on the lower half; thorax with four to five dorsocentral bristles posteriorly; tergites laterally with only sparse short recumbent bristles, except in some species longer bristles on the lateroposterior corners; metanotal callus with bristles; aedeagus bifid; length 7-12 mm. All species live in arid grasslands.

Key to the Species of *NEGASILUS*

1. Lateroposterior corners of tergites with one or more bristles longer than other vestiture 3
   Lateroposterior margins of tergites without bristles 2

2(1). Posterior sides of femora reddish yellow (Alberta)..... *aridalis* (Adisoemarto)
   Femora totally black ..... *gramalis* (Adisoemarto)

3(1). Posterior margin of scutellum usually without bristles, if present, short recumbent bristles pointed laterad (Alberta; Oregon; Nevada; California)..... ..... *belli* Curran
   Posterior margin of scutellum with long bristles; hind femora totally black 4

4(3). Epandria of male and sternite 8 of female orange (Alberta; Kansas; Idaho)..... ..... *mesae* (Tucker)
   Epandria of male and sternite 8 of female dark brown (Alberta; Arizona)..... ..... *cumbipilosus* (Adisoemarto)

Negasilus aridalis (Adisoemarto), new combination.

Asilus aridalis Adisoemarto, 1967, Quaestiones Entomologicae, vol. 3, p. 63, figs. 301-303.

DISTRIBUTION. Alberta.

Negasilus belli Curran.

Negasilus belli Curran, 1934, North American Diptera. The Ballou Press, N.Y., N.Y., p. 184.
Negasilus belli; James, 1941, Jour. Kansas Ent. Soc., vol. 14, pp. 44-45. Redescription.

DISTRIBUTION. Canada: Alberta; Saskatchewan. United States: California; Colorado; Nevada; Wyoming.

Negasilus cumbipilosus (Adisoemarto), new combination.

Asilus cumbipilosus Adisoemarto, 1967, Quaestiones Entomologicae, vol. 3, p. 62, fig. 300.

DISTRIBUTION. Canada: Alberta. United States: Arizona.

Negasilus gramalis (Adisoemarto), new combination.

Asilus gramalis Adisoemarto, 1967, Quaestiones Entomologicae, vol. 3, p. 64, figs. 304-306.

DISTRIBUTION. Canada: Alberta.

Negasilus mesae (Tucker), new combination.

Tolmerus mesae Tucker, 1907, Kansas Univ. Sci. Bull., vol. 4, p. 92.

DISTRIBUTION. Canada: Alberta; British Columbia. United States: Kansas; Wyoming; Idaho; Colorado; Utah.

Genus *PACHYCHOETA* Bigot

Pachychoeta Bigot, 1857. Type-species: *Erax annulipes* Macquart, 1846, Dipt. Exot., Suppl. 1, p. 83 (original designation).
Lecania [*Pachychaeta (sic)*]; Hull, 1962.

Hull (1962) reduced *Pachychoeta* Bigot to a subgenus of *Lecania* Macquart because both genera have a "similar face, wing venation, and terminalia". The general habitus of the two genera are similar, but the sexual organs of both sexes of each genus are strikingly different. The aedeagus of *Lecania* has two slender long apical tubes, but that of *Pachychoeta* is a single long slender tube.

The ovipositor of *Lecania* is cylindrical and without spines, but the ovipositor of *Pachychoeta* is spined on abdominal segments 9 and 10, and segment 9 has a ventral keel (fig. 78).

Lecania's antennal style is dilated and flattened apically, but that of *Pachychoeta* is more or less swollen in some species, but not in others; gibba of face weak, metanotal callus without vestiture; scutellum without long strong marginal bristles; ovipositor of *Pachychoeta maya* Martin with tergite 9 and sternite 9 coalesced, ventromedially folded into a broad keel with strong spines on the anterior margins, segment 10 more or less cylindrical, with spines ventrally; hypandrium long, apex free, base of epandrium more or less bulbous, apex narrow, variable in length. The ovipositors of named species have not been described.

Key to the Species of *PACHYCHOETA*

1. Hind femora yellowish with a black apex 6
Hind femora partially to totally black, or apex black and extending into narrow fascia 2

2(1). Hind femora totally black; lateral thoracic spots small, subshining blackish brown; apical bristles on epandrium angled mesad; length 18 mm. (Yucatan, Chiapas, Mexico)..... ..... *maya* Martin, new species
Hind femora partially black 3

3(2). Hind femora broadly black dorsally and apically, reddish yellow ventrally; lateral thoracic stripes broad, widely separated; apical bristles of epandria straight; length 15 mm. (Venezuela)..... ..... *caracasae* Martin, new species
Hind femora with reddish yellow not restricted ventrally 4

4(3). Hind femora with black apical band extending as a narrow black fascia dorsoanteriorly; length 15 mm. (Venezuela)..... *inca* Martin, new species
Hind femora without a narrow fascia 5

5(4). Apical third of hind femora blackish; face whitish, front brownish, occiput grayish brown; length 17 mm. (Honduras)..... *complicata* James
Most of hind femora and tibiae black; face and front yellowish brown, occiput pale yellowish brown; length 20-25 mm. (Guyana)..... ..... *genitalis* Bromley

6(1). Legs pale yellow, apex of hind and middle femora black; light brownish species; male genitalia small for the genus, shining black, narrower but as long as segments 7+8; length 18-24 mm. (Guyana)..... ..... *virilis* (Wiedemann)
Posterior tibiae reddish with apex black or nearly all black 7

7(6). Posterior tibiae reddish with black spines; thorax gray with black stripes; wings light brownish; length 18 mm. (Brasil)..... ..... *annulipes* (Macquart)

Posterior tibiae nearly all black; thorax grayish brown, gray to whitish laterally; wings nearly hyaline, apex brownish; length 18-23 mm. (Guyana)..... *apicalis* Bromley

Pachychoeta annulipes (Macquart).

Erax annulipes Macquart, 1846, Dipt. Exot., Suppl. 1, p. 83, tab. VIII, fig. 8.

DISTRIBUTION. Brasil.

Pachychoeta apicalis Bromley.

Pachychoeta apicalis Bromley, 1934, Asilidae. *In* Curran, Bull. Amer. Mus. Nat. Hist., vol. 66, art. 3, pp. 355-356.

DISTRIBUTION. Guyana.

Pachychoeta caracasae Martin, new species.

Male. Length 15 mm. Head black; face, front, light brownish to grayish brown, occiput above grayish brown, laterally gray to brownish gray tomentose; mystax bristles densest on oral margin, pale brownish white, sparse facial bristles black laterally and above, medially white; antennae black, segment 3 subequal to length of segment 1, style over twice as long as segment 3, slightly swollen apically; upper occipitals black, laterally weak and whitish.

Thorax black; light brown pollinose, posteriorly more grayish brown pollinose, median longitudinal stripe geminate, coalesced anteriorly, blackish brown, above anterior callus a round brown spot, on posterior declivity a dark brown triangular spot, two larger lateral spots blackish brown; scutellum brownish gray tomentose, sparse black short bristles on disc, no bristles on posterior margin; pleura pale brownish gray tomentose, between spiracle and wing base two narrow blackish brown fascia.

Abdomen black; looking down tergites blackish brown medially, gray laterally, tergite 2 broadly brownish gray tomentose laterally, tergite 3 similar, tergites 4-7 more narrowly gray laterally; epandrium basally elongate bulbous, narrow apex short; all bristles on apex of epandrium erect, vestiture pale brownish white; bristles stronger and longer

than other vestiture on posterolateral corners.

Wings brownish, discal cell divided by a crossvein which is probably anomalous.

Hind femora reddish ventroposteriorly, black dorsoanteriorly, tibiae black, reddish on dorsal basal third.

Female. Unknown.

TYPE MATERIAL. Holotype: male, Quebrada Caxia, south of Caracas, Venezuela, 18 July 1968, Chas. H. Martin (CAS).

Pachychoeta complicata James.

Pachychoeta complicata James, 1953, Jour. Washington Acad. Sci., vol. 43, pp. 52-53.

DISTRIBUTION. Honduras.

Pachychoeta genitalis Bromley.

Pachychoeta genitalis Bromley, 1934, Asilidae. *In* Curran, Bull. Amer. Mus. Nat. Hist., vol. 66, art. 3, p. 356.

DISTRIBUTION. Guyana.

Pachychoeta inca Martin, new species.

Male. Length 15 mm. Head black; face, front, vertex yellowish brown, occiput gray to brownish gray; mystax bristles white, a few black bristles above, upper occipital bristles black, more sparse than the lateral weaker whitish bristles; antennal segment 1 black, segment 2 about half as long as segment 1, dark red, segment 3 missing.

Thorax anteriorly yellowish brown, posteriorly grayish, median stripe geminate, coalesced anteriorly, blackish brown, two large lateral spots, small spots above anterior callus and below the large spots; scutellum pale brownish gray pollinose, sparse short black bristles on disc; pleura pale brownish gray to gray tomentose, vestiture sparse, pale.

Abdomen dark brown, sternites gray, incisures gray laterally; epandria bulbous basally, tapering to a narrow short apex; apical bristles of epandrium erect.

Wings brownish.

Hind femora yellow, black apically extending into a narrow fascia dorsally, forelegs totally yellowish red.

Female. Unknown.

TYPE MATERIAL. Holotype: male (abdominal segments with male genitalia cemented to segment 4), San Estaban, Venezuela, 1-15 December 1939, P. Andugo (CAS).

Pachychoeta maya Martin, new species.
(Figure 78.)

Male. Length 18 mm. Head black; face yellowish brown to brownish gray tomentose, front reddish brown, occiput gray to brownish gray tomentose; mystax bristles white, a few black bristles on face, upper occipital bristles black, strong, long, lateral bristles weaker, white to brownish white; antennae black, length of segment 3 subequal to segment 1, style 3 times longer than segment 3, slightly swollen apically.

Thorax black, anteriorly pale reddish brown, posterior declivity grayish to brownish gray tomentose, median stripe geminate, blackish brown, spot below median stripe on anterior declivity, two large lateral spots and a small triangular spot on posterior declivity; scutellum black, gray to brownish tomentose, disc with sparse black hairs; pleura pale brownish gray tomentose, sparse vestiture whitish.

Abdomen black; from above dark brown pollinose, grayish along lateral margin and venter, tergite 7 more broadly gray than other segments; apex of epandrium with erect brownish vestiture, base of epandrium bulbous, over twice as long as the narrow apex rounded apically, aedeagus a long, very slender single tube.

Wings brown.

Hind femora totally black.

Female. Similar to male, lateral margins of tergites more extensively gray than in male, keel of segment 9 with spines, tergite 10 with spines ventrally, numerous hairs obscure the keel.

TYPE MATERIAL. Holotype: male, San Jerómino, Tacaná, Chiapas, Mexico, 29 July 1970, E. C. Welling M. (CAS). Allotype: female (hairs broken off one side to expose keel on tergite+sternite 10), Pisté, Chiapas, Mexico, 25 July 1969, E. C. Welling M. (CAS). Paratypes: Mexico: 17 males, 1 female, Jerómino, Tacaná, Chiapas, July-August 1969-1970, E. C. Welling M.; 3 males, 1 female, Pisté, Yucatan, July-August 1968, E. C. Welling M.; 9 males, 1 female, Musté, Chiapas, July-November 1969-1970, E. C. Welling M. Guatemala: 1 male, 5 mi. E. Escuintla, 2500 ft., 1 July 1963, Scullen and Bollinger.

Pachychoeta virilis (Wiedemann).

Asilus virilis Wiedemann, 1828, Aussereuropäische zweiflügelige Insekten, vol. 1, p. 468.

DISTRIBUTION. Guyana.

Genus *NEOMOCHTHERUS* Osten Sacken

Mochtherus Loew, 1849. Type-species: *Asilus pallipes* Meigen, 1820. Designated by Coquillett, 1910. Preoccupied in Coleoptera, 1846.

Neomochtherus Osten Sacken, 1878.

The illustrations in Tsacas' (1968, 1969) magnificent monographs on the Palearctic and Ethiopian *Neomochtherus* Osten Sacken show that the more or less cylindrical and somewhat elongate aedeagus is a generic character. The Nearctic *Neomochtherus* have similar aedeagi with one, two, or three short microtubes on the apex.

The epandria of Ethiopian *Neomochtherus* show considerable divergence from the Nearctic and Palearctic epandria which are widest near the apex and have a vertical slot open dorsally. The slot in African *Neomochtherus* is open more or less ventrally.

Hull (1962) used the strong bristles on the posterior margins of the sternites of *Neomochtherus* to separate it from *Cerdistus* Loew which is usually without sternal bristles. The dorsocentral bristles of Palearctic and Nearctic *Neomochtherus* do not extend anteriad of the suture; in African species the bristles extend anteriad.

One species of North American *Cerdistus* is both with and without sternal bristles. A long series of *Cerdistus willistoni* (Hine) from Olympia, Washington are without sternal bristles, but a shorter series collected on the same dates at the same locality have the sternal bristles of *Neomochtherus*. The epandria place the species in *Cerdistus*. The aedeagus places it in both *Neomochtherus* and *Cerdistus*.

The similar aedeagi and overlapping chaetotaxy patterns seem to indicate that *Neomochtherus* is possibly a subgenus of *Cerdistus*.

Key to North American Species of *NEOMOCHTHERUS*

1. Hind femora broadly black anteriorly, red to blackish red, or with a fascia posteriorly (western United States)..... 3
   Hind femora black, narrowly reddish yellow basally (eastern United States)..... 2

2(1). Occipital bristles black; apical half of wings of male reddish brown apically, white basally; tibiae yellow, apically narrowly black; length 15-17 mm. (Massachusetts; New York; North Carolina)..... *latipennis* (Hine)

Occipital bristles pale; apical half of wings dark, hyaline basally; tibiae black; length 16-18 mm. (North Carolina; Virginia)..... ..... *angustipennis* (Hine)

3(1). Face gray; two strong black scutellar bristles, disc with short black bristles; median dark brown thoracic stripe widely separated; length 17 mm. (Oregon)..... *oregonae* Martin, new species

Face white, yellowish, or brown; disc of scutellum either with long pale pile or almost without pile 4

4(3). Face white; disc of scutellum almost without vestiture, two black scutellar bristles; wings hyaline, slightly clouded apically; length 15 mm. (Utah) ..... *hypygialis* (Schaeffer)

Face yellow or brown; disc of scutellum with long pale pile 5

5(4). Bristles on oral margin and lower gibba pale yellowish white, above black; thorax yellowish brown; wings brown, more densely anteriorly; length 17 mm. (Washington)..... ..... *olympiae* Martin, new species

Oral margin mystax bristles white or yellow, posterolaterally a few black bristles, black gibbal bristles 6

6(5). Oral margin mystax bristles yellow, black above; gibba grayish brown, face brown; length 16 mm. (Idaho)..... ..... *idahoae* Martin, new species

Oral margin mystax bristles white, black above, rather sparse; gibba and face yellowish brown; length 13 mm. (California)..... ..... *lassenae* Martin, new species

Neomochtherus angustipennis (Hine), new combination.

Asilus angustipennis Hine, 1909, Ann. Ent. Soc. Amer., vol. 2, p. 152.

DISTRIBUTION. Syntypes from North Carolina and Virginia.

Neomochtherus hypygialis (Schaeffer), new combination.

Asilus hypygialis Schaeffer, 1916, Jour. New York Ent. Soc., vol. 24, p. 68.

Schaeffer (1916) states "This species belongs in the subgenus or group Heligmoneura", which is an Eastern and not a Western Hemisphere genus. The epandria, which are 2 mm. across the apices, are wider than the abdominal segments.

DISTRIBUTION. Type-locality, Beaver Canyon, Utah.

Neomochtherus idahoae Martin, new species.

Male. Length 16 mm. Head black; face and front yellowish brown, more grayish brown on gibba, vertex and orbitals densely yellowish brown, disc more gray; mystax bristles on oral margin orange, a few on lower gibba, black on upper gibba, occipital vestiture yellowish; antennal segment 1 twice as long as 2, segment 3 missing on type.

Thorax black; dorsally grayish brown, laterally including anterior humeri and posteriorly gray, broad median stripe dark brown, separated narrowly by light brown line, lateral stripes paler brown; dorsocentrals abruptly decrease in length anterior to transverse suture, long pile on anterior humeri yellowish white, rest of vestiture black; scutellum gray tomentose with some brown, disc with sparse yellowish pile, two strong scutellar bristles yellow; pleura gray tomentose with some brown, vestiture yellow.

Abdomen black, tergites 2-4 gray pollinose anteriorly and posteriorly, dorsally broad brown posterior spot more dense medially, tergites 6 and 7 gray narrowly anteriorly, broadly laterally, broadly brown dorsally; tergites 2-4 and sternites 2-3 posteriorly with long yellow bristles stronger than other vestiture; hypopygium posteriorly broader than abdominal segments.

Wings hyaline, slightly tinged brownish.

Hind femora reddish yellow, black anteriorly, diffuse black fascia posteriorly.

Female. Unknown.

TYPE MATERIAL. Holotype: male, Long Valley, Alpha, Idaho, 11 August 1934, Charles H. Martin (CAS).

Neomochtherus lassenae Martin, new species.

Male. Length 13 mm. Head black; face and gibba coppery to yellowish brown tomentose, front brown tomentose, occiput brownish gray tomentose; mystax on oral margin yellowish white, gibbal, frontal, antennal, and strong occipital bristles black, discal pile gray; antennae blackish brown, length of antennal segments 1 + 2 subequal to segment 3, segment 3 subequal to style.

Thorax yellowish brown tomentose, anterior humeri, laterally, posteriorly, and between longitudinal stripes gray tomentose but at some angles of view gray changing to brown, broad median stripe reddish brown pollinose, extending to scutellum, divided by a narrow yellowish brown stripe, lateral stripes paler brown and more indistinct than median stripe; scutellum gray tomentose, sparse long whitish pile on disc, posteriorly two strong black bristles; pleura gray tomentose, brown before wing; apices of epandria slightly wider than abdominal segments.

Wings palely infuscated.

Hind femora reddish black anteriorly, dark red posteriorly.

Female. Unknown.

TYPE MATERIAL. Holotype: male, Mineral, California, Highway 36, 28 August 1948, Chas. H. Martin (CAS).

Neomochtherus latipennis (Hine), new combination.

Asilus latipennis Hine, 1909, Ann. Ent. Soc. Amer., vol. 2, p. 152.

DISTRIBUTION. Syntypes: New York, Massachusetts. New record: North Carolina.

Neomochtherus olympiae Martin, new species.

Male. Length 17 mm. Head black; gibba, face, and front reddish brown tomentose, occiput grayish brown tomentose, mystax bristles on oral margin and lower gibba yellowish white, bristles on upper gibba, front, and antennae black, strong occipital bristles mixed black and white, pile on occipital disc white; antennal segments black, segment 1 1.2 times longer than segment 2, segment 3 + microsegment 1.3 times longer than style, segments 1 + 2 subequal to segment 3.

Thorax reddish brown, broad reddish brown pollinose median stripe terminating on posterior declivity, lateral stripes brown pollinose, subshining at some views, anterior humeri yellowish to grayish brown tomentose, long whitish pile anteriorly, posterior humeri brownish gray; scutellum brown tomentose, long yellowish pile on disc; pleura brown tomentose.

From above tergites 2 and 3 brown pollinose, paler brown posteriorly, tergites 4-7 thinly dark brown pollinose, subshining, tergites 4-5 paler brown lateroposteriorly; long strong brownish yellow bristles on posterior margins of tergites, sternites 3-4 with yellowish bristles on posterior margins stronger than other vestiture; epandria slightly broader than abdominal segments 7-8, vestiture yellow.

Wings reddish brown, more pale posteriorly.

Hind femora black anteriorly, red posteriorly.

Female. Unknown.

TYPE MATERIAL. Holotype: male, Olympia, Washington, 22 September 1932, C. H. Martin (CAS).

Neomochtherus oregonae Martin, new species.

Male. Length 17 mm. Robust species; head black; gibba, face, front, and occiput gray tomentose, mystax bristles around oral margin, laterally along gibba and above on gibba black, medially gibbal bristles strong and white, antennal and frontal bristles black, occipital bristles mixed black and brownish white, occipital discal pile white.

Thorax brownish gray tomentose, median stripe brown, widely separated by a narrow grayish brown stripe, lateral spots gray to brown depending on view; long black dorsocentral bristles extend slightly anteriad to transverse suture, anterior humeri with short sparse black bristles; scutellum gray tomentose, sparse short black bristles on disc, two long black bristles posteriorly; pleura gray tomentose, brown posteriorly to spiracle 1.

From a dorsal view, abdomen broadly yellowish red-brown pollinose, laterally gray pollinose, from a lateral view broadly gray pollinose; long strong yellow bristles laterally on tergites, tergites 3-5 with a few strong yellow bristles on posterior margin, sternites 3-5 posteriorly with yellow bristles stronger than other vestiture.

Wings reddish brown, paler posteriorly.

Hind femora black with a broad red band anteriorly, red posteriorly.

Female. Unknown.

TYPE MATERIAL. Holotype: male, 2 miles west Sisters, Oregon, 25 June 1948, S. E. Crumb, Jr. (CAS).

Western Species of "*Asilus*" in Unknown Genera

The following 15 western North American species assigned to "*Asilus*" by Hine do not seem to fit into the genera treated in this paper. *Asilus albicomus* Hine, *A. lepidus* Hine, *A. montanus* Hine, and *A. willistoni* Hine may belong to *Cerdistus* Loew. *Asilus auriannulatus* (Hine) is a *Neoitamus* Osten Sacken. I have not seen *Asilus citus* Hine and *A. delicatulus* Hine.

Asilus albicomus Hine, 1909, p. 150. Montana.
Asilus astutus Williston, 1893, p. 70. California.
Asilus auriannulatus (Hine), 1906 (*Stilpnogaster*). British Columbia; Washington; California.
Asilus californicus Hine, 1909, p. 164. California.
Asilus citus Hine, 1918, p. 301. Arizona.
Asilus comosus Hine, 1918, p. 319. California.
Asilus delicatulus Hine, 1918, p. 320. New Mexico.
Asilus formosus Hine, 1918, p. 321. Kansas; Wyoming.

Asilus gilvipes Hine, 1918, p. 319. Colorado; New Mexico.
Asilus lepidus Hine, 1909, p. 150. Colorado; New Mexico.
Asilus montanus Hine, 1909, p. 149. California; British Columbia.
Asilus platyceras Hine, 1922, p. 7. Washington; Oregon.
Asilus sackeni Banks, 1920, p. 67. California; Oregon.
Asilus vescus Hine, 1918, p. 320. California.
Asilus willistoni Hine, 1909, p. 150. Washington; British Columbia.

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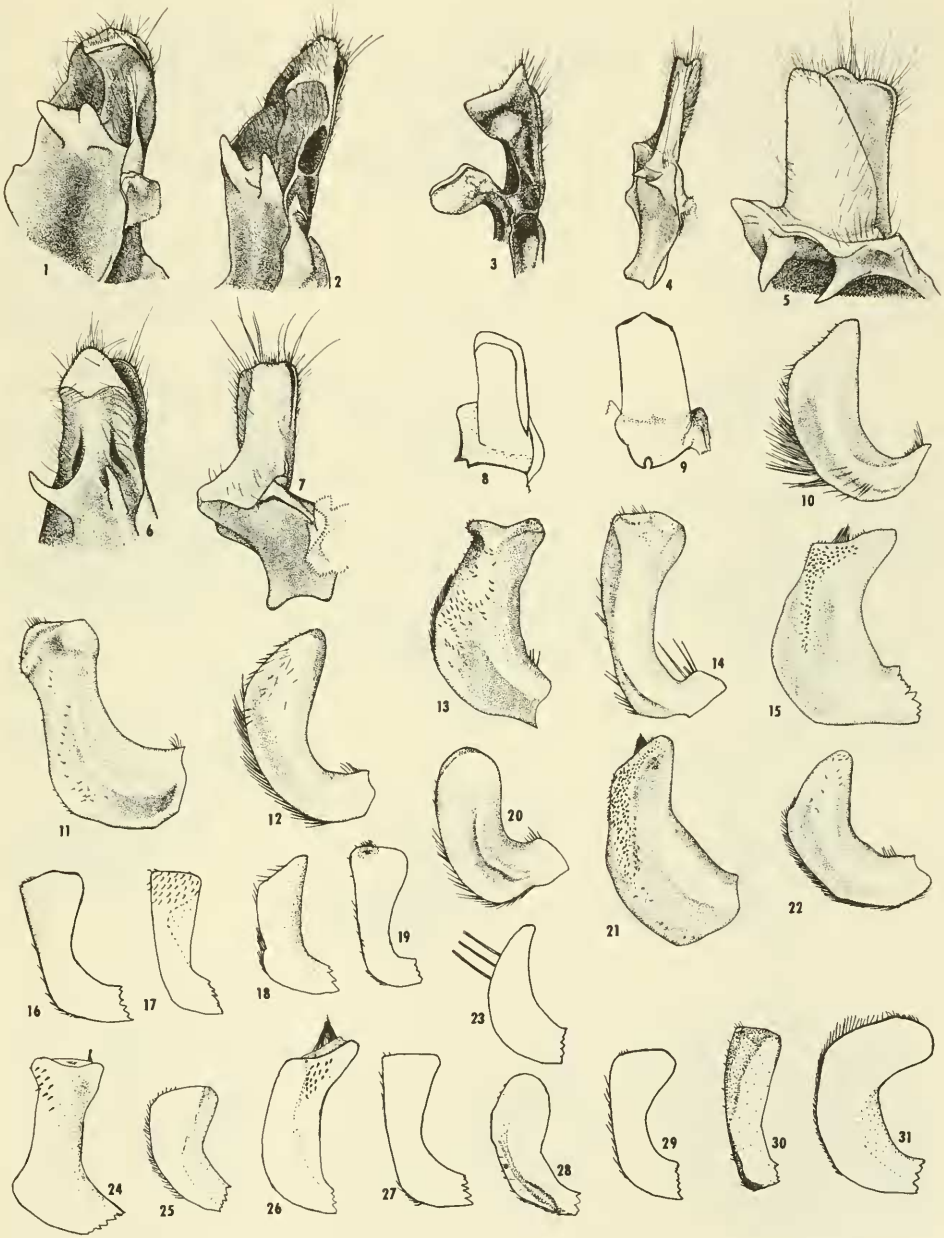
Index to Genera

Index to Species

TABLE 1. *Numbers of* M. longipenis *and* M. occidentalis *collected at Ozena Forestry Camp, California.*

Date collected	Number *Machimus longipenis*	Number *Machimus occidentalis*
3-27 June 1963	105	0
27 June - 12 July 1964	72	6
3 May - 27 June 1967	138	14

FIGURES 1-31. Figures 1-6. Proctigeral processes of *Machimus*. 1. *M. adustus*, new species. 2. *M. callidus* (Williston). 3. *M. sadyates* (Walker). 4. *M. submaculus*, new species. 5. *M. griseus* Hine. 6. *M. callidus* (Williston). Figure 7. *M. guttatus*, new species, proctigeral shelf. Figure 8. *M. acutus*, new species, proctigeral toothed processes. Figure 9. *M. niveibarbus* (Bellardi), proctigeral toothed processes. Figures 10-31. Dististyli of *Machimus*. 10. *M. mcalpinei*, new species. 11. *M. longipenis*, new species. 12. *M. adustus*, new species. 13. *M. notialis*, new species. 14. *M. tenebrosus* (Williston). 15. *M. sestertius sestertius*, new subspecies. 16. *M. brevis*, new species. 17. *M. grantae*, new species. 18. *M. truncatus*, new species. 19. *M. guttatus*, new species. 20. *M. painteri*, new species. 21. *M. occidentalis* (Hine). 22. *M. oriens*, new species. 23. *M. acutus*, new species. 24. *M. stanfordae*, new species. 25. *M. niveibarbus* (Bellardi). 26. *M. latapex latapex*, new subspecies. 27. *M. submaculus*, new species. 28. *M. ventralis*, new species. 29. *M. callidus* (Williston). 30. *M. griseus* Hine. 31. *M. cerasinus*, new species.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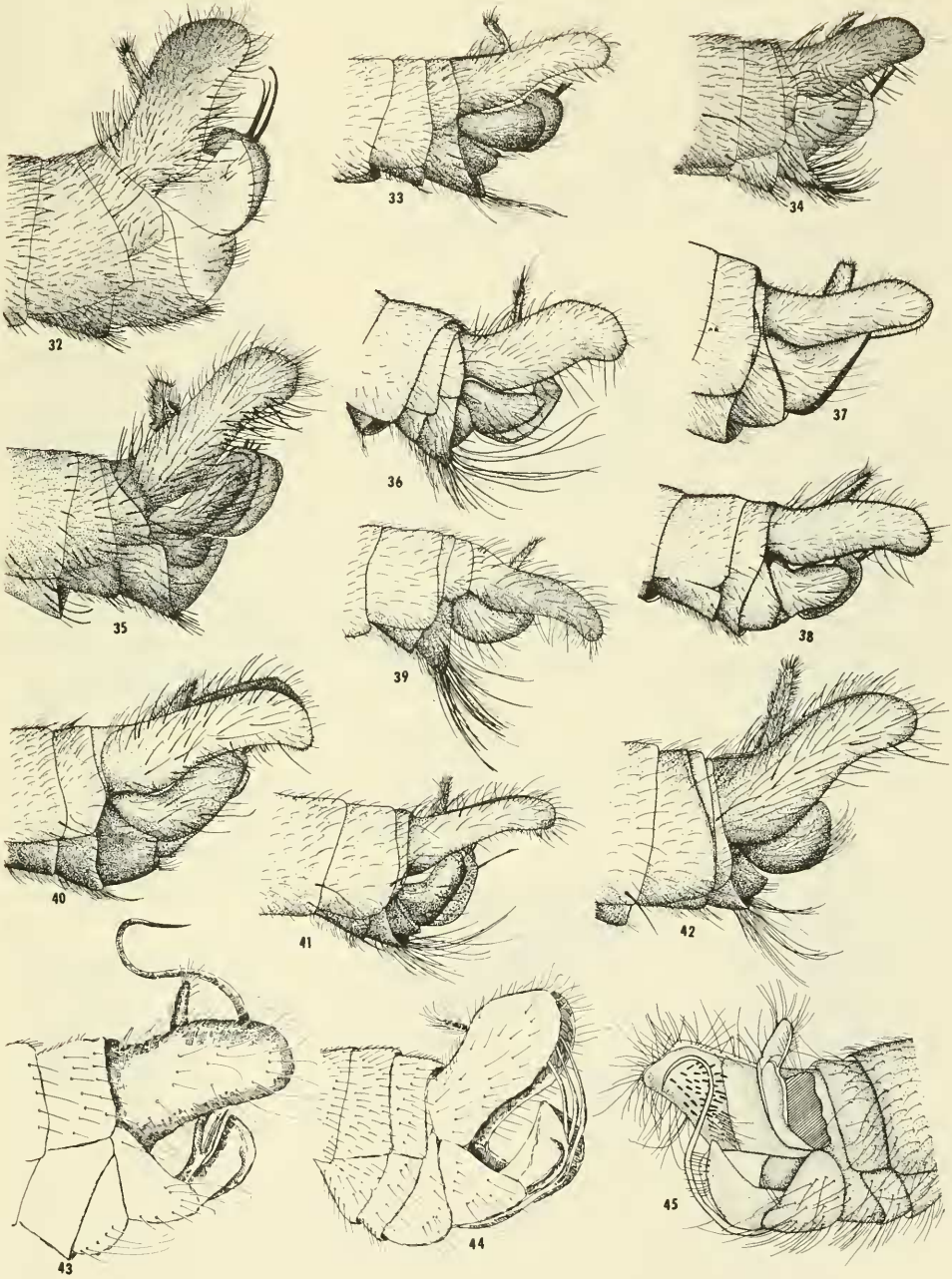
FIGURES 32-45. Figures 32-42. Male genitalia of *Machimus*. 32. *M. cerasinus*, new species. 33. *M. niveibarbus* (Bellardi). 34. *M. bromleyanus* (Carrera and D'Andretta). 35. *M. adustus*, new species. 36. *M. submaculus*, new species. 37. *M. humilis* (Bellardi). 38. *M. griseus* Hine. 39. *M. gertschi* (Bromley). 40. *M. callidus* (Williston). 41. *M. occidentalis* (Hine). 42. *M. ventralis*, new species. Figures 43-45. Male genitalia of *Polacantha*. 43. *P. compositus* (Hine). 44. *P. tridens*, new species. 45. spines inside epandrium, *P. compositus* (Hine).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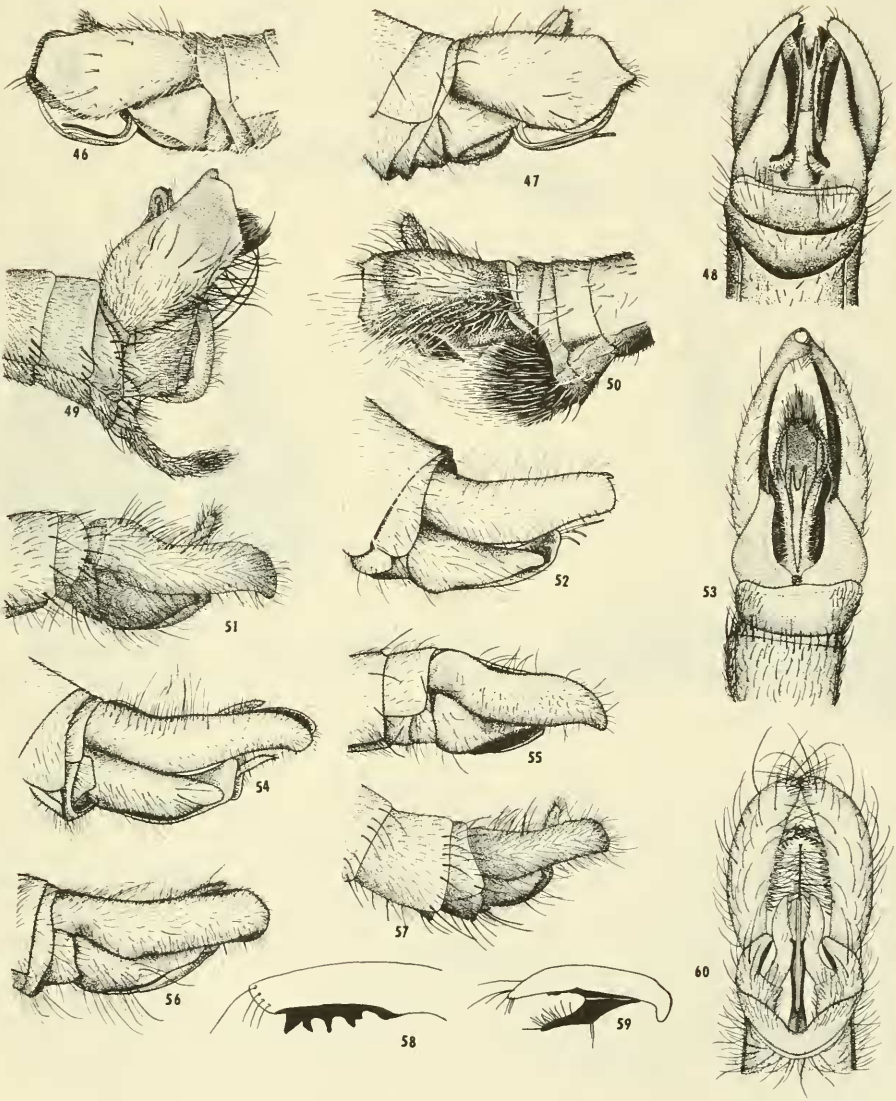
FIGURES 46-60. Male genitalia. 46. *Wilcoxius truncus*, new species. 47. *Wilcoxius acutulus*, new species. 48. *Furcilla dorothyae*, new species. 49. *Wilcoxius crenus*, new species. 50. *Wilcoxius lestes* (Williston). 51. *Prolatiforceps melanocera* (Williston). 52. *Prolatiforceps nigrocaudata* (Williston). 53. *Furcilla petila*, new species. 54. *Prolatiforceps neariacensis* (Bromley). 55. *Prolatiforceps dolichomera* (Williston). 56. *Prolatiforceps fenestella*, new species. 57. *Prolatiforceps anonyma* (Williston). 58. Mesal teeth, *Polacantha compositus* (Hine). 59. Inner process, *Polacantha pegma*, new species. 60. Ventral view, male genitalia, *Polacantha xanthocera* (Williston).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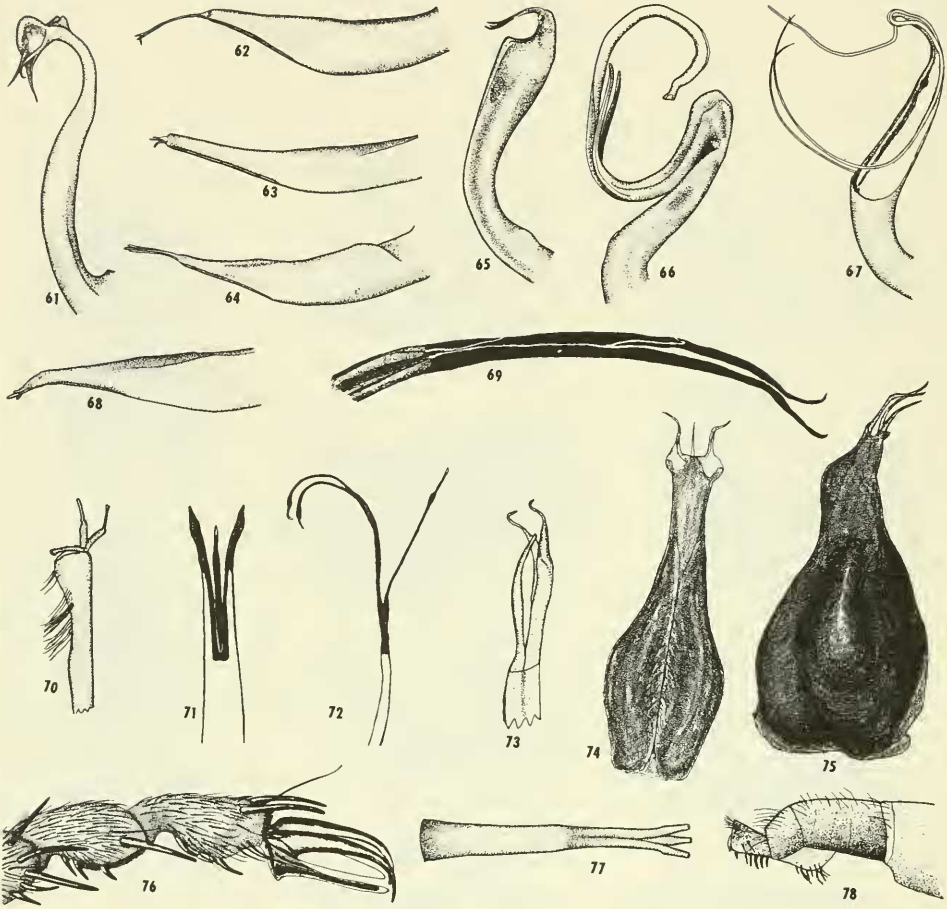

FIGURES 61-78. Figures 61-75, 77. Aedeagal sheath. 61. *Prolatiforceps fenestella*, new species. 62. *Prolatiforceps melanocera* (Williston). 63. *Prolatiforceps neariacensis* (Bromley). 64. *Prolatiforceps dolichomera* (Williston). 65. *Wilcoxius lestes* (Williston). 66. *Wilcoxius truncus*, new species. 67. *Wilcoxius crenus*, new species. 68. *Prolatiforceps anonyma* (Williston). 69. *Machimus sestertius sestertius*, new subspecies. 70. *Machimus coleus*, new species. 71. *Machimus grantae*, new species. 72. *Machimus occidentalis* (Hine). 73. *Machimus latapex convexus*, new subspecies. 74. *Wyliea mydas* (Brauer), dorsal view. 75. *Wyliea mydas* (Brauer), lateral view. 76. Dorsal view of fore tarsal spines, *Wyliea mydas* (Brauer). 77. Aedeagal sheath, *Machimus humilis* (Bellardi). 78. Ovipositor, *Pachychoeta maya*, new species.

MAP 1. Distribution of *Machimus occidentalis*.